Ebola Prevention Research:
The Role of Threat in Ebola Prevention Behaviours

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(cumulative thesis)

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Abstract

Globally, infectious diseases cause over 13 million deaths each year; they are among the leading causes of death and disability and remain an important global public health problem. For many infectious diseases, such as Ebola virus disease, vaccines and treatment options are in many countries not available or still in the testing phase. Therefore, prevention behaviours are key to avoiding the spread of infectious diseases and to reducing the occurrence of infectious diseases, particularly in developing countries. However, rates of effective prevention behaviours such as handwashing with soap in developing countries are remarkably low. Interventions that change health behaviour sustainably are thus in great demand. Effective promotion of a behaviour relies on an understanding of what determines and influences that behaviour. Rigorous evidence about the effectiveness of interventions is no less important in increasing the efficiency of public health interventions.

The present thesis aims to contribute to the evidence base on predicting and understanding the factors underlying prevention behaviours in outbreak settings by focusing on how contextual and psychosocial determinants are associated with prevention practices across two different populations and settings. Three empirical studies are included in this thesis; they were conducted in 2015 in Guinea-Bissau and the Gambia. At that time, the outbreak of Ebola virus disease in West Africa 2014-2016 was in full force in the neighbouring countries of Guinea, Sierra Leone, and Liberia. A theoretical framework and an established model for designing and evaluating behaviour-change strategies in developing countries, the risks, attitudes, norms, abilities, and self-regulation (RANAS) model of systematic behaviour change was applied in all three studies. The findings helped to ensure Ebola prevention instructions were followed by the populations in Guinea-Bissau and the Gambia, which were at high risk of an Ebola outbreak. The assumption is that perceived risk factors that are associated with prevention behaviours are of special relevance in a humanitarian emergency or outbreak situation, so this thesis emphasizes the role of threat.

For Studies 1 and 3, cross-sectional quantitative data were collected from 1369 respondents in Guinea Bissau. For Study 2, data were gathered from 498 respondents in the Gambia. In all studies, structured face-to-face interviews were used to collect cross-sectional data. Data were analysed by multiple and hierarchical multiple linear regression analyses and mediation analyses.

The first study revealed how high people's intention was to perform two different Ebola prevention behaviours and assessed the contextual and psychosocial factors underlying this prevention behaviours: calling the Ebola hotline to report a suspected case of Ebola, and not touching a person who might be suffering from Ebola. For the intention to call the Ebola hotline, only one contextual factor, age in years, was found to be relevant, when the relative associations of contextual factors have been assessed, meaning that younger people were more likely to use this service than older people. The most important psychosocial predictors of the intention to call the Ebola hotline were response belief, injunctive norm, personal norm, and commitment. The most important predictors of the intention not to touch someone who might be suffering from Ebola were risk perception, perceived severity, factual knowledge, response belief, the fear that others might think badly of them if they do not touch a person who might be suffering from Ebola, and self-efficacy.

The second study examined the effectiveness of Ebola prevention promotions in the Gambia, which had been implemented by the local partner before the study took place. It showed whether the promotions successfully tackled the key psychosocial determinants underlying the prevention behaviours, which is a precondition for the effectiveness of health promotions and enables understanding of why a promotional activity was effective. Three of the four promotional activities evaluated were significantly associated with some or all of the key psychosocial factors of handwashing and thus with increased handwashing behaviour, whereas only of the promotional activities was significantly, but negatively, associated with increased intention to call the Ebola hotline. Norm factors, especially descriptive norms, were strongly associated with handwashing behaviour and with calling the Ebola hotline. Response belief was a predictor of all three prevention behaviours. Commitment emerged as especially relevant for the intention to call the Ebola hotline and for not touching a person who might be suffering from Ebola.

In the third study, the psychosocial determinants of habitual handwashing with soap and water were assessed to learn how to achieve more sustained handwashing behaviour. The factors most relevant to handwashing habit were gender, perceived vulnerability, perceived severity, beliefs about costs and time, injunctive norm, and self-efficacy.

Many health promotion activities focus primarily on disseminating knowledge of the risks and benefits of hygiene practices. However, if raising knowledge about the dangers of a disease has a relatively small effect on people's behaviour, aid providers may need to adapt their mes-

sages accordingly. Overall, the results emphasize the importance of psychosocial factors for disease prevention behaviours. Outbreak response interventions should therefore rely on evidence to target the right psychosocial factors and so maximize their effects on prevention behaviours. Risk factors, response belief, norm factors, self-efficacy, and commitment were the key factors underlying Ebola prevention behaviours and should be addressed by behaviour change promotions. This research is relevant to further outbreaks of contagious diseases as it sheds light on important aspects of the impact of public health interventions during humanitarian emergencies and epidemics.

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List of Abbreviations

BCT	Behaviour Change Technique
EVD	Ebola Virus Disease
HAPA	Health Action Process Approach
KAP	Knowledge, Attitude and Practices
PMT	Protection Motivation Theory
R&D Blueprint	Research and Development Blueprint
RANAS	Risk, Attitude, Norm, Ability, and Self-regulation
SRHI	Self-Report Habit Index
TTI	Theory of Triadic Influence
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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Chapter I

General introduction

1 Overview and relevance of the topic

Infectious diseases cause over 13 million deaths each year and they are among the leading causes of death and disability (Cohen, 2000; WHO, 2017b), which can only be overcome with a multidisciplinary approach. Infectious diseases have been an ever-present threat to mankind, and achieving pandemic preparedness remains a major global challenge (e.g. Fauci, Touchette, & Folkers, 2005; Nii-Trebi, 2017). Humans and animals can be affected by infectious diseases and they are a significant public health threat with serious social, political, and economic consequences (Merianos, 2007; Nii-Trebi, 2017). Infectious diseases received more attention in the late 1960s to mid-1970s with the sudden appearance of viral haemorrhagic fevers such as Crimean-Congo haemorrhagic fever, Lassa fever, and Ebola fever. In the 1980s, other unusually large epidemics occurred of severe diseases including HIV/AIDS. Although much has been learned from previous outbreak events, the emergence of new and unrecognized infectious diseases continues, and outbreaks of old diseases recur. Numerous factors contribute to the continued emergence and transmission of new or already known infectious diseases, including more frequent travel, globalized trade and greater interconnectedness between countries, human behaviour and activities, pathogen evolution, poverty, changes in the environment and human interactions with animals (Nii-Trebi, 2017; WHO, 2017b).

For many infectious diseases, vaccines and treatment options are in many countries not available or still in the testing phase, so prevention behaviours play a crucial role in avoiding further transmission of pathogens. The main transmission route is often human-to-human contact. Consequently, individuals' prevention behaviours can avoid or reduce transmission, so these prevention behaviours are key to the control of infectious diseases. Huge promotional efforts, for instance to increase handwashing[1] behaviour, have been implemented in developing countries by development and relief organizations worldwide in an attempt to decrease the global burden of diarrhoeal and respiratory diseases (e.g. United Nations Children's Fund, 2008). However, handwashing campaigns include often no more than awareness-raising and education, and as key motivators disease avoidance or health benefits and they are rarely theory-based (Aboud & Singla, 2012; Curtis et al., 2011; Vujcic, Ram, & Blum, 2015). Additionally, studies have shown that even when the majority of a population understands the importance and protective effects of handwashing, only a minority performs the behaviour (e.g.

[1] In the following, handwashing means handwashing with soap.

Steadman Group, 2007; Vivas et al., 2010). Knowing why and how a behaviour has to be executed is a key precondition for a behaviour, especially when it is a new behaviour that has to be performed when a new situation arises. One example of such a new, emerging situation is an outbreak of a contagious disease such as Ebola virus disease (EVD); this is the context in which the studies of this thesis were conducted. Protective behaviours in this case include avoiding physical contact with an infected person, washing or disinfecting hands, avoiding unsafe burials, seeking care early, and gaining comprehensive knowledge about the characteristics of the disease, including transmission routes and methods of prevention. A growing understanding of what drives prevention behaviour is providing new approaches to change behaviour. However, some important gaps in this knowledge exist, and, even after such knowledge has been gained, additional interventions might be necessary to achieve a sustained behaviour (Aboud & Singla, 2012; Curtis et al., 2011). An example of such a behaviour that needs to sustain is handwashing, which is always to be performed, especially in settings where water, sanitation and hygiene (WASH) infrastructure is inadequate. This fact is increasingly being recognized by WASH professionals.

Another issue in the behaviour change sector is that many programmes lack comprehensive evaluation (e.g. Aboud & Singla, 2012; Parkinson, 2009; Vujcic et al., 2015). It is important to know how to encourage people not only to adopt health behaviours but also to perform them in the long term. Existing theories and frameworks of health behaviour change to promote health-protective behaviours have been increasingly applied by researchers and practitioners in recent decades. The underlying paradigm of these theories postulates that behaviours are driven by social-cognitive factors. To change the target behaviour, then, interventions have to change the factors underlying the behaviour. To achieve this, these underlying factors first need to be identified. With this knowledge, new behaviours can be promoted more effectively by tackling their underlying key factors. Despite substantial efforts in developing, testing, applying, and refining health behaviour theories, little is yet understood about what actually drives behaviour change (Lippke & Ziegelmann, 2008), especially in humanitarian emergency[2] and outbreak situations (Parkinson, 2009; Vujcic et al., 2015). The circumstances of an emergency are unique and range from unpredictable, rapid, and highly traumatic events to cyclical, more predictable events such as floods and other natural disasters. During the first phase of an emergency, response agencies focus on the provision of essentials such as

[2] A humanitarian emergency is an event or series of events that represents a critical threat to the health, safety, security or wellbeing of a community or other large group of people, usually over a wide area. In the following, emergency stands for humanitarian emergency (Humanitarian Coalition).

shelter, food, drinking water, latrines, and medicine. Except in WASH-related disease outbreaks, the promotion of prevention behaviours are often considered as secondary, despite their relevance (Vujcic et al., 2015).

Interventions that change health behaviour effectively and sustainably are in great demand in international collaboration. In addition, the effectiveness of hygiene promotion efforts in emergency and outbreak settings has not been adequately evaluated. Thus far, it has widely been assumed that an emergency or outbreak setting influences the impact of health behaviour interventions (Parkinson, 2009; Vujcic et al., 2015), but little empirical evidence exists to support this assumption.

The present thesis aims to contribute to the evidence base for predicting and understanding prevention behaviour in outbreak settings by focusing on how social-cognitive determinants of behaviour are associated with prevention practices across different populations and settings. Although evidence has shown that theory-based behaviour change interventions result in improved behavioural outcomes (e.g. Aboud & Singla, 2012; Baranowski, Lin, Wetter, Resnicow, & Hearn, 1997; Fishbein & Cappella, 2006; Glanz & Bishop, 2010), the use of theories and models in the design and assessment of behaviour change activities is rare (Dreibelbis et al., 2013; Lippke & Ziegelmann, 2008), particularly during emergencies and outbreaks.

The goals of this thesis are to identify contextual and psychosocial determinants of EVD prevention behaviours and to reveal people's intention in Guinea-Bissau and the Gambia to comply with EVD prevention instructions so as to ensure that EVD prevention instructions are followed by the populations of Guinea-Bissau and the Gambia. These two countries were threatened by an EVD outbreak during the outbreak in West Africa 2014-2016. Another objective was to investigate which EVD prevention promotions, implemented by affiliates of a local NGO in the Gambia, were effective and why by looking at the underlying mechanisms. Furthermore, the predictors of handwashing habit were identified to learn how to achieve more sustained handwashing behaviour. Three studies are included in this thesis, which address the objectives of the thesis. The studies were conducted in 2015 in Guinea-Bissau and the Gambia, while the outbreak of EVD was in full force in the neighbouring countries of Guinea, Sierra Leone and Liberia.

Thus, the focus of this thesis is on the perception of a health threat and the association of this threat with EVD prevention behaviours. The thesis provides a short overview of the social-

cognitive theories relevant to threat and risk perception with regard to health behaviours. The findings presented in this thesis can be used to develop effective intervention programmes, to align existing hygiene programmes with relevant psychosocial factors, and to strengthen the capacities of Guinea-Bissau and the Gambia to face another EVD outbreak.

This dissertation consists of five chapters. The introduction begins with a section about outbreaks of infectious diseases and prevention, particularly EVD. The next section of the introduction chapter presents the theoretical background and factors steering health behaviours and behaviour change, and particularly the role of threat in health behaviour change. The same section also presents theories and frameworks developed specifically for changing health behaviours in developing countries. Then, theory-based behaviour change will be discussed and an insight into the evidence base for prevention behaviours in emergency and outbreak situations will be given. Further, the objectives and research questions of this thesis are presented. The end of the introduction section contains a description of the three empirical studies constituting this thesis. The second, third, and fourth chapters consist of the three empirical studies of thesis. The final chapter discusses the results of the studies and embeds them in the broader research context.

2 Outbreaks of infectious diseases and prevention

Globally, infectious diseases such as pneumonia and diarrhea are among the major causes of death in the under-fives. According to estimations, 50% of these deaths were caused by infectious diseases and conditions such as pneumonia, diarrhoea, malaria, meningitis, tetanus, HIV, and measles (UNICEF, 2015). Despite large reductions in child mortality since 2000, diarrhea and respiratory infections such as pneumonia remain major causes of avoidable child deaths worldwide (Liu et al., 2015). Causing nearly 15 million (>25%) of the 57 million worldwide deaths annually, infectious diseases are among the leading causes of death (WHO, 2004). The highest death and disease burden from diarrhea and respiratory infections has been found in Sub-Saharan Africa (Murray et al., 2012; You, Bastian, Wu, & Wardlaw, 2013).

Outbreaks of infectious diseases, as for instance the EVD, are exacerbated by modern frequencies of travel, globalized trade, and greater interconnectedness between countries. These mean that outbreaks of international concern are practically inevitable and remain unpredictable, despite prevention and control efforts (WHO, 2017b). New, emerging, and neglected infectious diseases are a significant burden on public health and the economies of societies all over the world, especially when few or no medical treatments exist for these diseases (Nii-Trebi, 2017). Pathogenic microorganisms such as bacteria, viruses, parasites and fungi cause infectious diseases, which can be spread directly or indirectly from one person to another (WHO, 2017a). Diarrhoeal diseases are characteristically transmitted via the faecal-oral route: Pathogens from the faeces of one person are ingested by another (Curtis, Cairncross, & Yonli, 2000). The majority of emerging infectious diseases of humans, 75%, are zoonotic; they are infectious diseases of animals that can also cause disease when transmitted to humans (Merianos, 2007), such as EVD. The West Africa EVD epidemic mobilized numerous actors globally to find medical technologies to address the disease and save lives. One result of these efforts was the VSV-EBOV vaccine (Henao-Restrepo et al., 2015), which so far has been highly effective. However, large gaps were also found in the way the global scientific and development community organizes itself during an epidemic. Based on the experiences and lessons learnt during the West Africa EVD epidemic, the World Health Organization (WHO) developed a Research and Development Blueprint (R&D Blueprint) for action to prevent future epidemics (WHO, 2017b). The R&D Blueprint is a global strategy and preparedness plan to enable a rapid activation of R&D activities during epidemics and contains a list of priority

diseases.The most recent review of this list took place in January 2017. This list enumerates the emerging disease pathogens that present the greatest risk of epidemics or pandemics in the near future (Merianos, 2007; WHO, 2017b) and for which there are no or insufficient countermeasures. These include arenaviral hemorrhagic fevers such as Lassa Fever, Crimean Congo Haemorrhagic Fever (CCHF), Ebola virus, Marburg virus, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), other highly pathogenic coronaviral diseases such as Severe Acute Respiratory Syndrome, (SARS), Nipah, Rift Valley Fever, Severe Fever with Thrombocytopenia Syndrome, and Zika. The list is not exhaustive, and the WHO has stressed the importance of continuing research and development on diseases other than those currently on the priority list. Other diseases with epidemic potential, such as influenza, yellow fever, cholera, dengue, and some others that also present significant health risks, are not on this list because their control and research networks are identified elsewhere (WHO, 2017c).

2.1 Prevention measures during outbreaks of infectious diseases

2.1.1 Significance of WASH and WASH behaviours in preventing disease transmission

In 2012, an estimated 842,000 diarrhoea deaths were caused by inadequate WASH measures[3] (502,000 from inadequate drinking water, 280,000 from inadequate sanitation and 297,000 from inadequate hand hygiene) from 1.5 million diarrhoeal deaths. Particularly in low-income settings, unsafe water, inadequate sanitation, and insufficient hygiene are important risk factors (Prüss-Ustün et al., 2014). Poor WASH practices[4] increase an individual's exposure to faecal pathogens through multiple pathways, such as water, flies, food, soil, and hands (Eisenberg, Scott, & Porco, 2007), and limits disease outbreak response. Conversely, adequate WASH practices are an important barrier to the faecal–oral spread of diarrhoea because they prevent pathogens from reaching the domestic environment and hence their subsequent ingestion (Curtis et al., 2000).

WASH measures aim to reduce the exposure to pathogens and so protect health. Rapid WASH provision in emergency settings can prevent outbreaks and the burden of disease and

[3] WASH measures include the provision of safe water, safe excreta disposal and basic hygiene measures such as handwashing stations.

[4] WASH practices include for instance safe storing of drinking water in the household, using toilets and handwashing at critical junctures.

death associated with natural or man-made disasters (Brown, Cavill, Cumming, & Jeandron, 2012). Good WASH practices applied consistently in both healthcare settings and the community enable the prevention of human-to-human transmission of many infectious diseases, including EVD (WHO, 2014a).

2.1.2 Impact of handwashing

Hygiene behaviour change is a key aspect of effective infectious disease management. Systematic reviews have shown that washing hands at critical junctures is one of the most effective and cheapest public health measures to control the spread of infectious diseases (Cairncross et al., 2010; Curtis & Cairncross, 2003; Ejemot-Nwadiaro, Ehiri, Meremikwu, & Critchley, 2008; Fewtrell et al., 2005). Handwashing can reduce the risk of diarrheal diseases by almost half, and it reduces the risk for acute respiratory infections (Aiello, Coulborn, Perez, & Larson, 2008; Curtis & Cairncross, 2003; Rabie & Curtis, 2006). Furthermore, handwashing is also thought to be relevant in reducing the transmission of infections such as influenza, helminths, trachomae, neonatal infections, HIV-associated infections and environmental enteropathies (Aiello et al., 2008; Blencowe et al., 2011; Curtis et al., 2011; Ejemot-Nwadiaro et al., 2008; Filteau, 2009; Freeman, Clasen, Brooker, Akoko, & Rheingans, 2013; Greenland, Cairncross, Cumming, & Curtis, 2013; Isaac, Alex, & Knox, 2008; Rabiu, Alhassan, Ejere, & Evans, 2012). A randomised controlled trial in Pakistan found a 50% lower incidence of diseases in children younger than five years resulting from handwashing (Luby et al., 2005). Key junctures for handwashing are after defecation, after handling faeces or cleaning up a child after defecation, before preparing food, before feeding a child, and before eating. There is evidence that hand hygiene improvements are needed for ensuring the impact of improvements in water and sanitation (Wright, Gundry, & Conroy, 2004). Good hand hygiene prevents the recontamination of safe drinking water, while improved sanitation in public buildings or schools without sufficient improvement in handwashing behaviour enhances the risk of a contamination with *Escheria coli* (*E. coli*) at this place (Greene et al., 2012).

Despite its protective effect, the prevalence of handwashing at key junctures is low. According to estimations, approximately 19% of the world population washes hands after contact with faeces (Freeman et al., 2014). An 11-country review found that primary caregivers in developing countries practiced handwashing at only 17% of times after using the toilet and only 13% of times before preparing food (Curtis, Danquah, & Aunger, 2009). Therefore, sub-

stantial promotional activity is still needed to change handwashing behaviour, especially in countries with a high burden of disease (Freeman et al., 2014).

2.2 Ebola virus disease

The first Ebola virus species was discovered in 1976 in the Democratic Republic of Congo, in a village near the Ebola River, from which the disease takes its name. Since 2000, 14 outbreaks of EVD have occurred, 13 out of these in African countries. The most often affected states were the Democratic Republic of the Congo and Uganda; the outbreak in West Africa from 2014 to 2016 was the largest in history, affecting multiple countries in and beyond West Africa (CDC, 2016a).

Ebola is an aggressive pathogen that causes an acute, serious illness. This illness, known as Ebola Virus Disease, has emerged as one of the deadliest forms of hemorrhagic fevers in both humans and nonhuman primates (monkeys, gorillas, and chimpanzees). It is assumed that the virus is animal-borne and that fruit bats are natural Ebola virus hosts. Ebola enters the human population through direct contact with the blood or other bodily fluids of infected animals. These infected animals are usually found ill or dead in the rainforest (WHO, 2016c). Bush meat represents an important source of protein for the population in tropical Africa, and hunting and eating wild forest animals is a socio-cultural practice in many African countries (Ordaz-Németh et al., 2017). This represents a primary infection route for people consuming contaminated meat. In the human population, EVD spreads through human-to-human transmission via direct contact with the blood or other bodily fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with or has died from EVD. Surfaces and materials (e.g. bedding, clothing, and needles) contaminated with these fluids can also transmit the virus to humans (WHO, 2016c). Another important route of EVD transmission is through burial practices that involve direct contact with the body of the deceased. In past outbreaks, case fatality rates[5] varied from 25% to 90%, with an average case fatality rate of around 50%. The incubation period[6] is 2 to 21 days, and the mean infectious period in recent outbreaks was 5.7 days (Chowell & Nishiura, 2014). Until a person develops symptoms, he or she is not infectious. Since the disease is only spread by direct con-

[5] The case fatality ratio confers the virulence of the pathogen by calculating the proportion of number of deaths to total number of Ebola cases.

[6] The incubation period is the time interval from infection with the virus to onset of symptoms.

tact with the secretions of a person showing signs of infection, the potential for a widespread outbreak of EVD is considered low. People remain infectious as long as their blood contains the virus (CDC, 2016a).

Traditional healers played a direct role in the amplification of the 2014-2016 epidemic, because they usually treat through direct body contact with the sick, or they keep the sick in their household for several days, where they also come into contact with the family members of the sick, who spread the virus further in their communities. Hunters are at higher risk for an infection; they often become infected when they slaughter, handle, or transport infected animals from the forest (Allaranga et al., 2010). Epidemics in rural areas are not normally of great magnitude, but they become problematic when they reach, for instance, health care systems (CDC, 2016a). The first symptoms of EVD are a sudden onset of fever, severe headache, muscle pain, and sore throat. The next symptoms are vomiting, diarrhea, rash, symptoms of impaired kidney and liver function, and both internal and external bleeding (e.g. oozing from the gums, blood in the stools). Sick people need treatment of the specific symptoms and supportive care rehydration with oral or intravenous fluids (CDC, 2016a). Currently, no proven treatment is available for EVD. An EVD vaccine is in the testing phase, and has mainly been used to contain flare-ups in 2016 under an emergence use protocol (Skrip & Galvani, 2016). The mean number of years between EVD outbreaks has been found to be 1.49 (House, 2014).

2.2.1 The largest outbreak of Ebola virus disease

The outbreak of EVD in West Africa from 2014 to 2016 was the largest and most complex outbreak of EVD in history, with 28,646 suspected, probable, and confirmed cases and a total of 11,323 deaths (WHO, 2016b). This number includes more cases and deaths than from all other outbreaks combined, in which a total of 2,427 reported cases and 1,597 deaths occurred (CDC, 2016b). The main affected countries were Guinea, Liberia, and Sierra Leone (see Figure 1); the virus spread from Guinea across land borders to Sierra Leone and Liberia. Thirty-six confirmed cases were reported from Nigeria, Senegal, Spain, the United Kingdom, Mali, Italy, and the United States (WHO, 2016a).

On August 8, 2014, WHO established that the EVD epidemic was a public health emergency of international concern (WHO, 2016e) and urged the global community to increase and coordinate their efforts to control the outbreak. The Emergency Committee convened by the WHO Director-General advised that the EVD outbreak in West Africa constituted an ‘ex-

traordinary event' and a public health risk to other states. The possible consequences of further international spread were seen as serious in view of the virulence of the virus, the intensive community and health facility transmission patterns, and the weak health systems in the affected and most at-risk countries. A coordinated international response was essential to stop and reverse the international spread of EVD (WHO, 2014b).

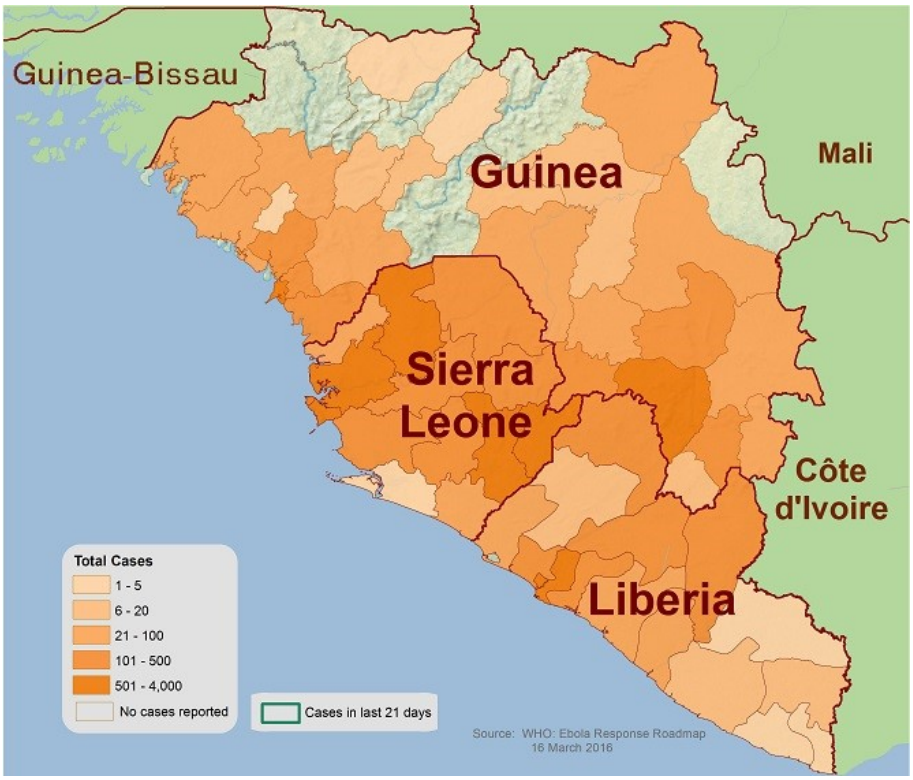

Figure 1: *Main affected countries of the EVD outbreak 2014-2016 (WHO, 2016d)*

Beyond the devastating effects of EVD on health, numerous other effects arose, such as the impact of EVD on the economies of the three countries. Major economic costs included lower investments, a significant loss in private sector growth, and food security issues due to a decline in agricultural production (World Bank, 2015a, 2015b, 2015c). The epidemic had a strong direct impact on the health care system: Liberia lost 8%, Sierra Leone lost 7%, and Guinea lost 1% of their doctors, nurses, and midwives to EVD (Evans, Goldstein, & Popova, 2015). The epidemic led to an approximate 50% reduction in health care services and caused setbacks in the three most affected countries in the treatment and control of HIV, tuberculosis, and malaria (Parpia, Ndeffo-Mbah, Wenzel, & Galvani, 2016).

2.2.2 Ebola outbreak origins and patterns

While the timing of the 2014-2016 outbreak of EVD may be difficult to explain, the areas affected by EVD show underlying patterns that contributed to its emergence, rapid spread, and uncontrolled nature (Akhtar, Befkadu, Basu, & Kumar, 2014; Bausch & Schwarz, 2014). Generally, large outbreaks of hemorrhagic fever virus diseases occur in regions with similar conditions. The three countries most affected by the EVD outbreak, Guinea, Sierra Leone, and Liberia, are among the poorest countries in the world (UNDP, 2016). The historical burden of the civil wars in Liberia and Sierra Leone, corruption, and stalled development in Guinea left the region highly vulnerable to an EVD outbreak of large dimensions (Bausch & Schwarz, 2014). Figure 2 shows some of the possible triggers of an EVD outbreak (Akhtar et al., 2014).

A study analysing the environmental factors underlying EVD epidemiology since the beginning of EVD outbreaks in 1976 found that lower temperature and higher absolute humidity are long-linearly associated with a higher risk of EVD outbreak in humans (Ng, Basta, & Cowling, 2014). Forests have played a crucial role in all EVD outbreaks. Deforestation leads to an increased frequency of contact between bats and humans, and the thinning of forests created porous borders between Guinea the neighbouring countries of Sierra Leone and Liberia (Bausch & Schwarz, 2014). Furthermore, people with a micronutrient deficiency, particularly selenium deficiency in early childhood, are more vulnerable to infection by EVD due to their weakened immune system (Taylor, 1997). Seasonal shifts, particularly from rainy to dry seasons, have been shown to correlate with EVD onsets. The seasonal migration patterns of bats, which are natural hosts of the Ebola virus, lead to a cycle of bats coming into contact with humans and causing recurring outbreaks of EVD (Ng et al., 2014). In summary, the socio-political and environmental climate are crucial for the spread of the infection; these circumstances dictate whether the virus can infect a few isolated cases or whether the outbreak is large and uncontrolled (Bausch & Schwarz, 2014). When failed development or years of civil conflict have weakened the economy and the health system, and biological factors increase the probability of the virus emergig from the forest, then the conditions are in place for a large outbreak (Bausch & Schwarz, 2014).

Fighting and controlling an EVD outbreak in an impoverished environment is a challenge for several reasons. People are forced to expand their livelihood activities in more remote areas; for instance, they penetrate deeper into the forest to hunt bush meat or to find wood to pro-

duce charcoal, they start to extract minerals from deeper mines, and thus they enhance their risk of being exposed to the Ebola virus and other pathogens (Bausch & Schwarz, 2014). If an infected person then goes to a neglected health care facility with inadequate medical preventive measures lacking protection material, clean needles, disinfectants, and gloves, then the affected person, other patients, and health workers are at high risk of becoming infected by EVD and subsequently of not receiving adequate treatment in their turn. A classic pattern is that patients infected in the health facility return home and bring the virus into their houses. This is what happened in Guinea, where a health worker triggered the spread of the virus to the region of the health facility and eventually to the capital, Conakry (Baize et al., 2014). This in turn decreases the trust of the population in the health facilities. However, it is crucial for outbreak control that people go to the health facility and allow the health workers to treat them there (Bausch & Schwarz, 2014).

A large EVD outbreak requires a sound response, which is hardly possible from a government with limited resources. Fluid borders, monitored by weak governments, missing or insufficient coordination and communication between governments of neighbouring countries, poor infrastructure and transport, and additional issues like language barriers led to a situation that enabled the virus to spread rapidly and uncontrollably.

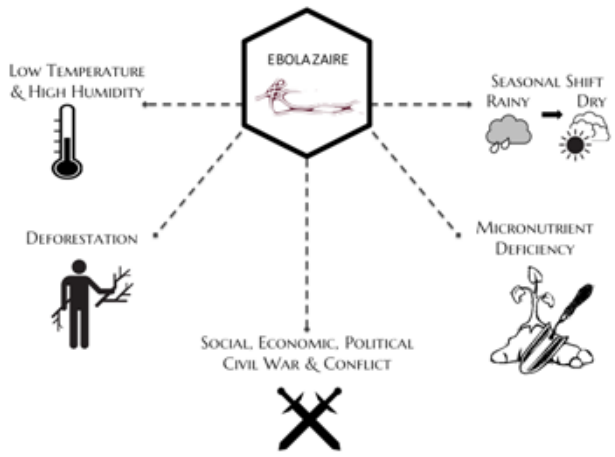

Figure 2: *Possible outbreak triggers (Ng et al., 2014)*

2.3 Prevention behaviours relevant for Ebola outbreaks

Pathogens such as the Ebola virus spread via similar transmission routes as diarrheal and other diseases, involving bodily fluids, flies, and food (Waddington, Snilstveit, White, & Few-

trell, 2009). Adequate EVD outbreak control relies on a package of interventions, including case management, surveillance and contact tracing, a good laboratory service, safe burials, and social mobilization (WHO, 2016c). Many of these outbreak control measures require specific behaviours of individuals. One condition for successful case management is that an infected person is brought to a health facility or at least that a health worker is informed about the affected person. In two of the studies in this thesis, the intention to call an implemented Ebola hotline to report a suspected EVD case is the behaviour of interest. Another aspect of case management is not touching someone who might be infected with EVD; this is also an important protection behaviour at burials. The intention not to touch a suspected EVD case was another behaviour of research interest in two studies in this thesis. An epidemiological modeling study to investigate the effects of behavioural changes on the transmission of EVD found that a crucial impact of prompt human behavioural response on the infection rate. The social distancing of infected individuals, including not touching a person who might be suffering from EVD, can significantly reduce the transmission of the disease between infected individuals and their close social environment (Hu, Bianco, Edlund, & Kaufman, 2015). As well handwashing at critical times plays a crucial role to avoid further transmissions of the virus. Hopman and colleagues (2015) conclude in their systematic review on hand hygiene and the use of chlorine in preventing the spread of EVD that handwashing is effective and should be one of the standard precautions. Other preventive behaviours during an EVD outbreak include avoiding contact with infected fruit bats, monkeys, and apes and the consumption of their raw meat to reduce the risk of wildlife-to-human transmission. The risk of human-to-human transmission through direct contact with the bodily fluids of people with EVD symptoms can be reduced by the use of appropriate protective equipment. Other outbreak containment measures include prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with EVD and monitoring their health status for 21 days, good hygiene, and maintaining a clean environment (WHO, 2016c). Good collaboration between the health care system and the communities is highly relevant, and in general, community engagement is key to successfully controlling outbreaks (WHO, 2017b).

3 Theoretical background and factors steering health behaviours and behaviour change

Health behaviours are of key importance in areas such as prevention and treatment (Lippke & Ziegelmann, 2008). Many health behaviours, such as hygiene behaviours, household water treatment options, and seeking health care are cost effective and known for their significant and sustained impact on prevention of diseases, disability, and death (Aboud & Singla, 2012). Hence, achieving that people perform these behaviours and that they maintain them is important. According to Flay and colleagues (Flay, Snyder, & Petraitis, 2009), two things are crucial when investigating health promotion: the causes of health behaviour and the effective promotion of health-enhancing behaviours. A number of factors have been identified as determining improved practices and the adoption of WASH behaviours (Dreibelbis et al., 2013). These determinants have been organized into theoretical frameworks and models that enable researchers to describe and understand processes, to gain knowledge, and to accumulate evidence. Theories are not only needed to explain and predict health behaviour, but also to design and evaluate interventions (Lippke & Ziegelmann, 2008). The use of behavioural theories to guide programme development has been suggested to increase the effectiveness of health behaviour change interventions (Aboud & Singla, 2012; Michie & Johnston, 2012). There is evidence that the use of behavioural theories and frameworks in the design and implementation of behaviour change interventions results in improved behavioural outcomes compared to interventions that are not theory-based (e.g. Aboud & Singla, 2012; Baranowski et al., 1997; Fishbein & Cappella, 2006; Glanz & Bishop, 2010). However, the use of theories and models in the design and assessment of WASH-related behaviour change activities is rare (Dreibelbis et al., 2013), particularly in outbreak and emergency settings. Therefore, this thesis aims to contribute to the understanding which factors determine EVD prevention behaviours and how interventions can be developed with this knowledge. It is important to identify and understand the factors that determine health behaviour if it is to be predicted and explained. These findings provide a foundation for the development of effective health promotion interventions (Curtis et al., 1995; Michie, Johnston, Francis, Hardeman, & Eccles, 2008).

In recent decades, understanding and predicting health behaviours and behaviour change has attracted great research interest within health psychology. As a result, several social-cognitive theories and models have been developed which aim to identify the determinants and process-

es underlying behavioural changes (Conner & Norman, 2005). As the specific research interest of this dissertation is the perceived threat of EVD, the only theories and models considered are those that address perceived threat. In general, social cognition models assume that an individual's perception of the social environment or the objective conditions is key to understanding the behaviour of this individual (Conner & Norman, 2009).

The following sections describe some of the most common social cognition theories and models that include threat and the understanding of health behaviours. Then, the role of threat in health behaviour change is examined specifically. Other concepts presented include those of behavioural maintenance and habit, intention and willingness. The last part of this chapter includes several theories and frameworks for health behaviour change in developing countries.

3.1 Social-cognitive theories of health behaviours and behaviour change

3.1.1 Health Belief Model

The Health Belief Model (HBM; Becker, Drachman, & Kirscht, 1974; Rosenstock, 1974) is regarded as the beginning of systematic and theory-based research into health behaviour (Conner & Norman, 2005). The goal of the model was to explain health behaviour and to identify factors that can be influenced by health programmes. The basic assumption of the HBM is that the probability of a behaviour change increases with the extent of the perceived threat and the extent of the perceived effectiveness of the health behaviour to reduce this threat. Threat perceptions consist of two factors: perceived vulnerability and perceived severity of a certain disease. Perceived vulnerability relates to beliefs about the susceptibility to a disease or a health threat such as EVD. Perceived severity represents the estimation of the perceived negative consequences of a disease or a health threat; for instance, EVD is normally seen as very severe, whereas diarrhea is often seen as less severe. The perceived effectiveness of the health behaviour also consists of two factors: the utility and the costs of the behaviour. The utility of calling an Ebola hotline and reporting a suspected EVD case could be to prevent other family members from contracting EVD. Costs or barriers could be other people thinking that the person who called does not want to take care of the sick person. In the revised version of the HBM, health motivation, meaning the willingness to take care of health issues and health questions, has been added to the model (Abraham & Sheeran, 2005). Furthermore, cues

to action and situational factors (e.g. health campaigns) were added to the model. Sociodemographic (e.g. gender, age) and psychological characteristics (e.g. personality) are also included in the model.

One criticism of the HBM is that the perceived threat and the perceived effectiveness of the health behaviour are assumed to be sufficient to change behaviour (Knoll, Scholz, & Rieckmann, 2011). A meta-analysis of the relationships between four HBM dimensions (susceptibility, perceived severity, benefits, and costs) and health behaviour on 16 studies that measured all four of the dimensions found weak effect sizes for the predictive power of these factors (Harrison, Mullen, & Green, 1992). Another criticism is that self-efficacy and intention are missing from the model; intention in particular is seen as one of the most important factors in most other theories of behaviour change (Knoll et al., 2011).

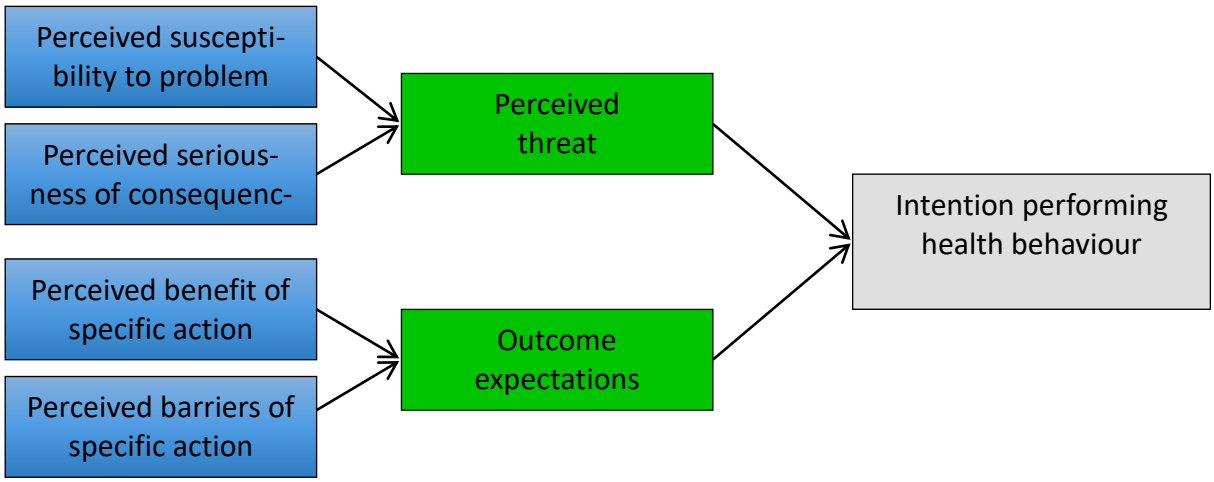

Figure 3: *Health Belief Model (Becker et al., 1974; Rosenstock, 1974)*

3.1.2 Protection Motivation Theory

The Protection Motivation Theory was (PMT; R. W. Rogers, 1975) developed for risk communication research to identify how a communicated threat influences intention (the theory uses the term protection motivation) and behaviour. Maddux and Rogers (1983) revised the PMT by combining the protection motivation theory with environmental-related factors and intrapersonal predictors. Two processes are assumed to influence intention, which has always been measured as goal intention: threat appraisal and coping appraisal. Threat appraisal composes a cost-benefit analysis to test whether a certain behaviour will be executed or not. The benefit part includes a reward, such as protecting the family from diarrhea by washing hands before preparing food, whereas the cost part consists of two components: the perceived se-

verity and the perceived vulnerability to a threat. If the person concludes that the costs of not executing a certain behaviour are higher than the benefits, the person will start to think about how to cope with the health threat. Coping appraisal comprises self-efficacy, response efficacy, and the costs of the behaviour. Originally, intention was seen as the variable linking the threat appraisal and the coping appraisal. The behaviour, termed the coping reaction, is understood as and termed adaptive (performing health behaviour and stopping performance of the risk behaviour) or maladaptive (continuing with risk behaviour). Whether a coping reaction is adaptive or maladaptive depends on the intention of an individual. As the PMT is quite complex, most studies used only the core factors of the theory: perceived severity, perceived vulnerability, response efficacy, self-efficacy, intention, and behaviour (Knoll et al., 2011). The PMT has been successfully applied in numerous studies and for a range of health issues and health behaviours. A meta-analysis by Floyd and colleagues (Floyd, Prentice-Dunn, & Rogers, 2000) found that increases in perceived severity, perceived vulnerability, response efficacy, and self-efficacy facilitated adaptive intentions and behaviours, and conversely, decreases in maladaptive response rewards and adaptive response costs increased adaptive intentions and behaviours. Nevertheless, the variables of coping appraisal were found to have a greater predictive validity than those of threat appraisal. Effect sizes were higher for concurrent behaviour than for predicting future behaviour (Milne, Sheeran, & Orbell, 2000).

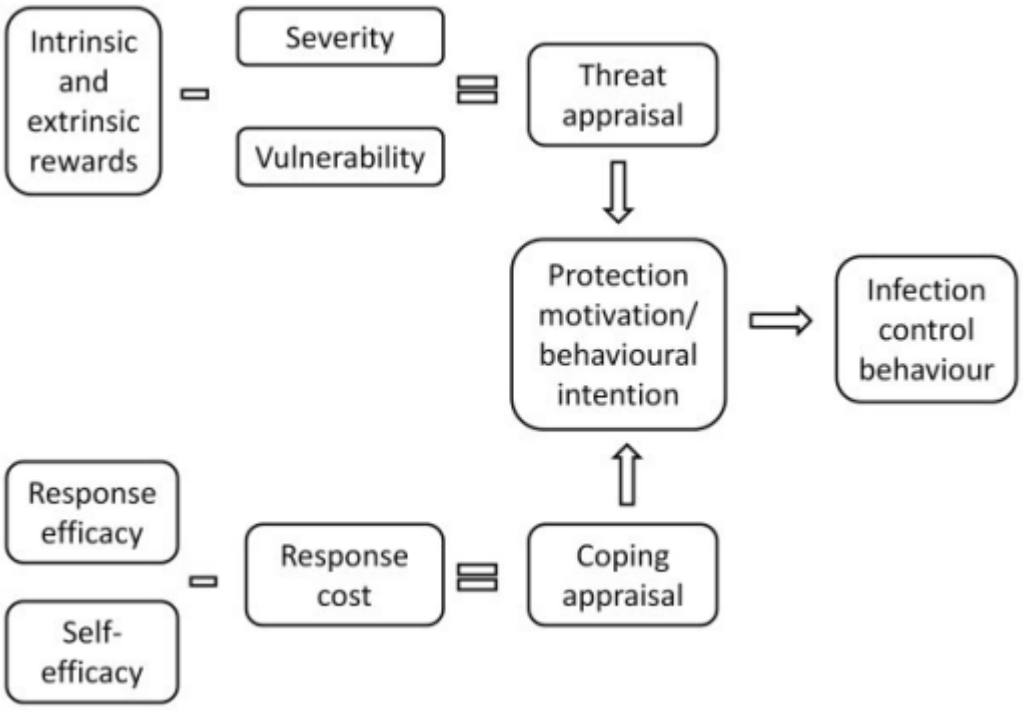

Figure 4: *Protection Motivation Theory (R. W. Rogers, 1975)*

3.1.3 Health Action Process Approach

The Health Action Process Approach (HAPA; Schwarzer, 2008) is a model of the adoption and maintenance of health behaviours. It tries to close the intention–behaviour gap (see section 3.4 Intention and willingness) and distinguishes between two phases: the pre-intentional, motivational phase and the post-intentional, volitional phase. The initial motivational phase includes processes that lead to the formation of a behavioural intention, whereas in the volitional phase other processes lead to the actual performance and maintenance of the health behaviour. The model emphasizes the volitional phase, which is often neglected in other social cognition theories and models (Schwarzer & Renner, 2000). In the motivational phase, three predictors are used to predict the intention: risk perception, outcome expectancies, and action self-efficacy. Risk perception is further divided into perceived vulnerability and perceived severity. After a person has formed an intention, for instance to wash hands at key junctures, the person enters the volitional phase, meaning that the motivational phase has ended. The model added planning between intention and behaviour, to bridge the intention–behaviour gap (Orbell & Sheeran, 1998). Planning emerged as crucial for the translation of intentions into actions (Gollwitzer, 1993) and is represented in the HAPA as action planning and coping planning. In the volitional phase, the intention has to be transformed into action, and this action has to be maintained, what involves self-regulatory skills and strategies. Health behaviour is often behaviour that needs to be sustained in the long term, so the successful uptake of a behaviour has to be maintained or re-executed after interruptions. A number of factors can facilitate or hinder the translation of intentions into action (Schwarzer, 2008): coping planning, maintenance, and recovery self-efficacy. Perceived self-efficacy has been found to be important during the entire health behaviour change process (Bandura, 1997). However, different kinds of self-efficacy have to be considered depending on the specific situation of an individual. The HAPA incorporates phase-specific self-efficacies; action self-efficacy, maintenance self-efficacy, and recovery self-efficacy are distinguished, which has proven useful (Renner & Schwarzer, 2005; Scholz, Sniehotta, Burkert, & Schwarzer, 2007). Action self-efficacy is an optimistic belief that is required at the very beginning of the behaviour change process, when the motivation and the intention to act are developed. Maintenance self-efficacy is an optimistic belief about one's own capability to overcome barriers during the maintenance period, and recovery self-efficacy is meant to be required to recover from setbacks (Schwarzer, 2008).

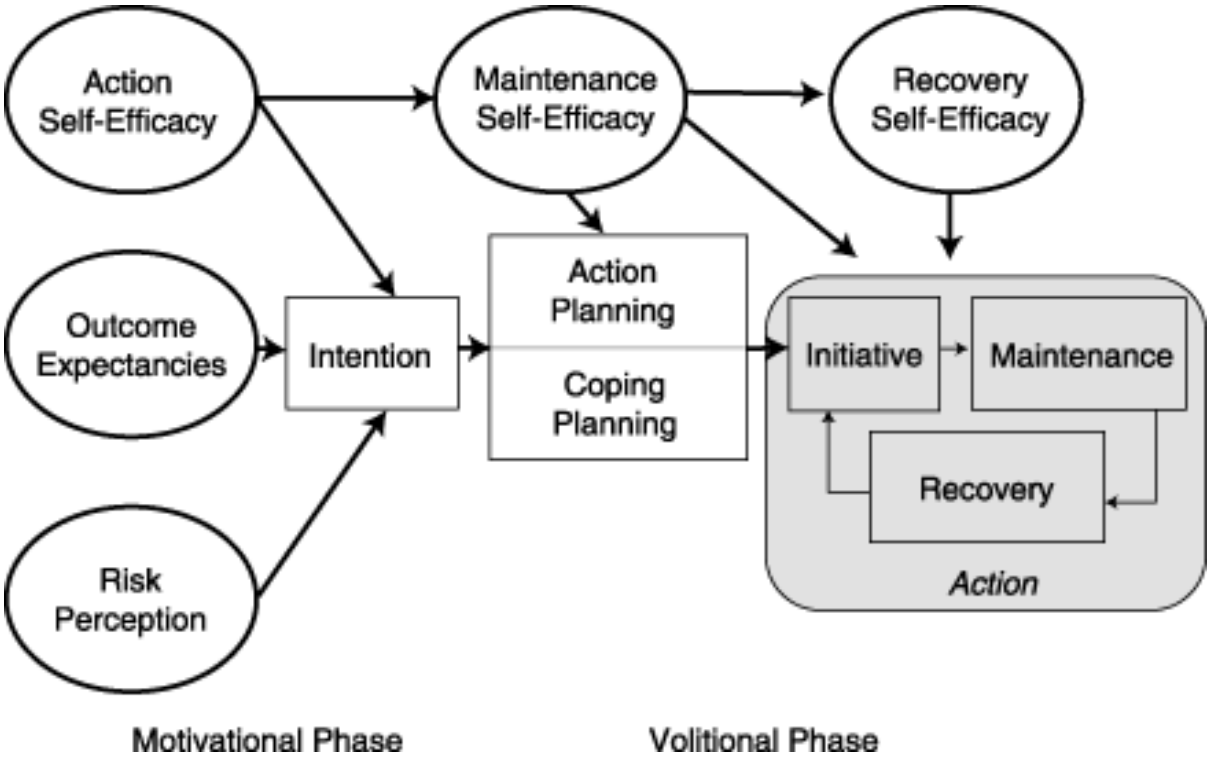

Figure 5: *Health Action Process Approach (Schwarzer, 2008).*

Various studies have successfully used the HAPA to explain behaviour change in different health behaviours, including physical exercise (Lippke, Ziegelmann, & Schwarzer, 2004), nutrition (Renner & Schwarzer, 2003; Schwarzer & Renner, 2000), and preventive examination (Luszczynska & Schwarzer, 2003). A major difference between the HAPA and the HBM or the PMT is that it considers factors beyond the first phase of a behaviour change, such as coping planning, maintenance, and recovery self-efficacy, which are assumed to be more decisive for behaviour change (Schwarzer, 2008).

However, the distinction between motivation and volition had already been made by Heckhausen (J. Heckhausen & Heckhausen, 2010). According to Heckhausen (H. Heckhausen, 1987, motivation is what happens before an intention is formed. By forming an intention, the Rubicon[7] has been crossed, and the individual enters into the volitional phase, in which the intention has to be implemented.

[7] River in Italy, which was crossed by Caesar before the civil war. By crossing the Rubicon, the decision for the war was made.

3.1.4 Theory of Triadic Influence

A unifying framework that organizes the constructs from many health behaviour theories is the theory of triadic influence (TTI; Flay et al., 2009). The theory aims to provide a more coherent structure for the comprehensive integration of variables to understand influences on health behaviour and thus to develop effective health promotion campaigns. The model organizes theories of health behaviours and variables along two dimensions: levels of causation (from distal to proximal predictors) and streams of influence (personal, social, and environmental; see Figure 6). The most proximal behavioural predictors are trial behaviours and experiences, which are determined by intention. Intentions are seen as causally proximal or immediate and influence behaviour directly, whereas the variables that determine intention are more causally distal. These include self-efficacy, behavioural control, social normative beliefs and attitudes toward the behaviour. The predictors of intention are again influenced by an even more distal level of variables, such as motivation to comply, perceived norms, knowledge, and values. These variables are determined by predisposing factors, such as social competence and information. The most distal influencing variables are the ultimate underlying variables such as biology, personality, the social situation, and the cultural environment. Within each stream of influence, the effects of ultimate and distal causes of behaviour are mediated through more proximal behavioural predictors. The authors assume that the more proximal a predictor is, the more this factor is behaviour-specific and the easier it is to change this factor and to target it in campaigns. However, more proximal predictors are assumed to achieve a less sustained behaviour change effect and to have lower potential to generalize to other behaviours (Flay et al., 2009).

The TTI suggests that an increased focus on different distal and proximal levels of influence will lead to more sustainable effects from behaviour change promotions. This is in line with the IBM-WASH model (Dreibelbis et al., 2013), whereas in many other theories, this is not considered. The multitude of factors in the TTI is notable, and it provides a comprehensive overview of opportunities for behaviour change interventions.

However, the complexity of the theory is a challenge for practitioners and researchers, as it is difficult to use and to test the predictive power of the entire theory. At the individual level, the TTI has not contributed much compared to other theories, because it lacks post-motivational factors. As in Schwarzer's HAPA (2008), self-efficacy and outcome expectancies directly predict the intention. The innovation of the TTI is that it emphasizes the position of the social-

cognitive factors relative to the behaviour. This theory is described in this thesis, because it might be of relevance for the assessment of the relative effects of contextual and psychosocial factors on EVD prevention behaviours measured in two of the studies in this thesis.

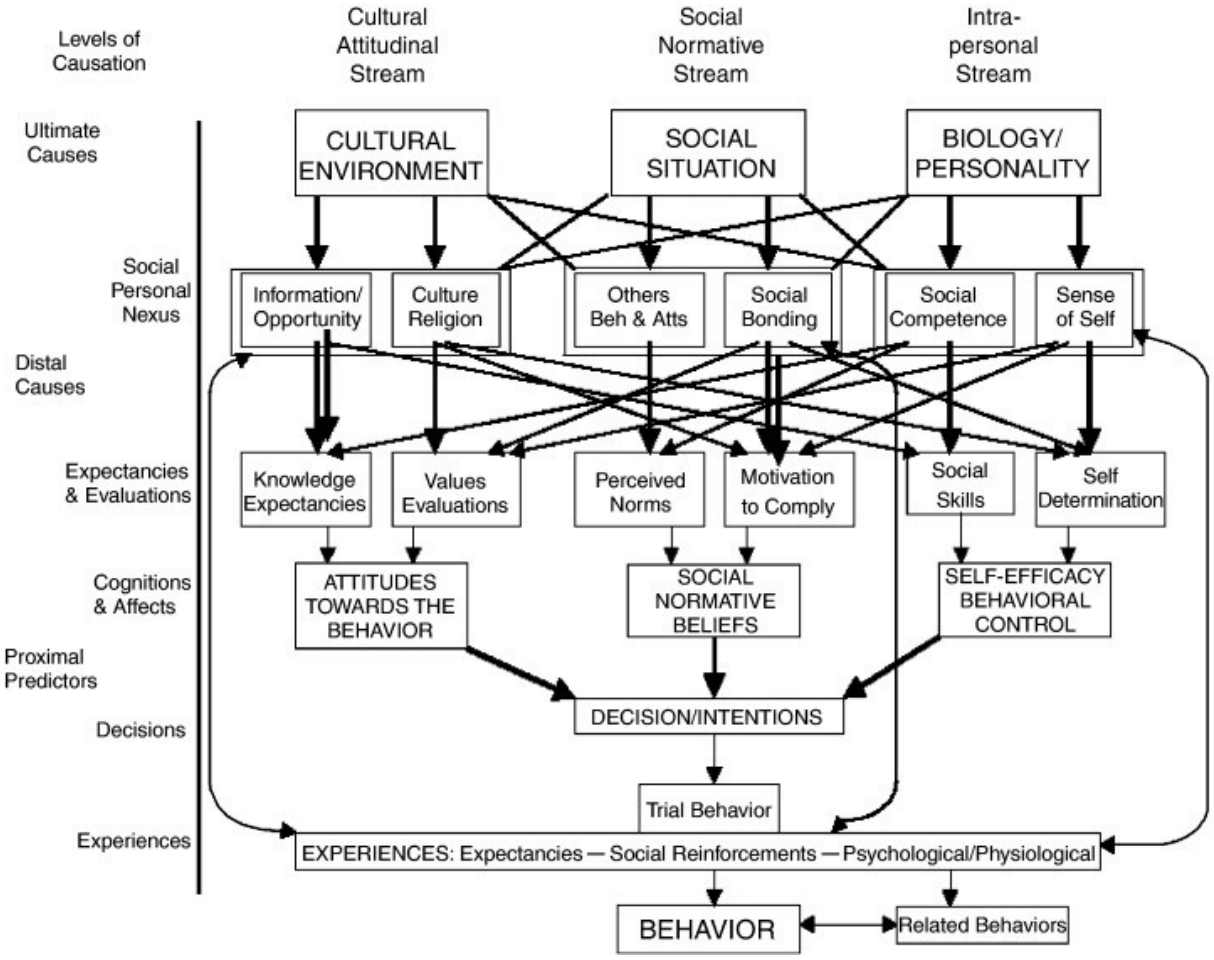

Figure 6: *Theory of Triadic Influence (Flay et al., 2009).*

3.2 The role of threat in health behaviour change

Threat means the perceived danger or negative outcomes linked to the performance or non-performance of a behaviour. It is an external stimulus variable that exists independently of whether a person knows about it or not (such as the outbreak of a contagious disease like EVD) (Witte, 1992). Two dimensions constitute the concept of threat: perceived susceptibility or vulnerability and perceived severity. Perceived vulnerability refers to an individual's assessment of the risk posed by a particular threat or disease; it is the individual's belief about the chances of experiencing a certain threat (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977; Maddux & Rogers, 1983). Perceived severity is an individual's assessment of the seri-

ousness of the consequences of contracting a certain disease (Floyd et al., 2000; Rosenstock, 1974) for instance whether diarrhea affecting a newborn is seen as more serious than diarrhea affecting an older child or an adult, in particular if the mother is aware that babies are more susceptible to diarrhea. A substantial quantity of research has focussed since 1950 on explaining the reactions of individuals to fear appeals and threat responses. Although many inconsistent results were found, fear appeals were considered generally effective in producing attitude change (Maddux & Rogers, 1983; Shelton & Rogers, 1981). An important outcome of the development of fear appeal theories was that researchers became aware of the crucial role of cognitive processes in persuasion and behaviour change (Maddux & Rogers, 1983). Early models, like the drive-reduction model (Janis, 1967) assumed that an emotional state of fear was required for the effects of a fear appeal communication. The parallel response model by Leventhal (1970) emphasized the difference between emotional responses and cognitive responses (fear control versus danger control). The next theoretical step came from Rogers's protection motivation theory (R. W. Rogers, 1975), which linked cognitive mediating processes to antecedent communication stimuli. According to several theories, risk perceptions accelerate the process of intention development, but empirically, only small correlations have been found for risk perception and intention (Lippke et al., 2004). The HAPA model (Schwarzer, 2008) includes risk perception as one of the three variables playing a major role in the intention-forming process, assuming that perceiving a health threat (risk perception) is a minimum requirement for any motivation to adopt a health behaviour. Lippke and colleagues (2004) also assume that generally, the initial risk perception may initiate a motivation to change, but later other factors become more influential. In cross-sectional designs, risk perception has been shown to play only a minor role if any. Nevertheless, perceived threat of illness, together with knowledge, are often key components of behaviour change promotion strategies (Dreibelbis et al., 2013). However, it has not been confirmed that scaring people into healthy behaviours is actually effective (Ruiter, Abraham, & Kok, 2001). Albarracin and colleagues (2003) found in their meta-analysis that factual knowledge and arguments to increase perceived vulnerability had only small effects on behaviour change with regard to HIV prevention. Weak effect sizes for susceptibility and perceived severity for different health behaviours were also found in a meta-analysis by Harrison and colleagues (1992).

The threat of a severe or epidemic disease such as EVD or cholera may enhance the immediate motivation to perform prevention behaviours temporarily. Curtis and colleagues (2009) found this relation for handwashing behaviour in Uganda, Senegal, Kenya and Peru during

cholera epidemics. However, when the danger had passed, people said that they returned to their usual handwashing habits. In general, Curtis and colleagues (2009) did not find that fear of disease motivated handwashing, except for the cholera phases, but even then, other factors were important, such as feeling ashamed to have cholera in the household and affecting the status of the family. The authors concluded that the immediate threat of an epidemic disease can lead to increases in prevention behaviours such as handwashing, as the experience of threat during emergencies can influence the perceived risk, but it does not lead to a behaviour change after the epidemic (Curtis et al., 2009; Vujcic et al., 2015).

3.3 Behavioural maintenance and habit

After a behaviour change has taken place, the behaviour has to be sustained over the long term. For the maintenance of the behaviour, habits are essential (e.g. Lally & Gardner, 2013; Tobias, 2009). Habits are hypothesized to have characteristics relevant for health behaviour changes (Gardner, 2015). A habit can be defined as a behaviour that is frequently repeated, has acquired a high degree of automaticity, and is cued in stable contexts (Orbell & Verplanken, 2010). This definition contains the three key aspects that are assumed to create a habit, namely frequency, automaticity, and contextual stability (Orbell & Verplanken, 2010). Habits have often been understood as previous behaviour or behaviour frequency. However, according to Verplanken and Orbell (Verplanken & Orbell, 2003), a habit is a psychological construct with numerous facets, and it is more than merely past behaviour frequency, as behaviour frequency does not necessarily result in a habit (Verplanken, 2006). Verplanken and Orbell (2003) developed a 12-item index of habit strength to measure this construct, which is the most commonly used habit measure. The self-report index of habit strength (SRIH) provides a practical measure to obtain a valid and reliable indication of habit strength.

There is a lack of studies on interventions that aim to achieve habitual behaviour (Verplanken & Orbell, 2003). Interventions usually focus on forming new behaviours or on changing old behaviours, but habits are rarely integrated in implementation strategies (Lally & Gardner, 2013; Verplanken & Orbell, 2003). Habit has been emphasized by the IBM-WASH model (Dreibelbis et al., 2013) and also represents an important outcome in the risks, attitudes, norms, abilities, and self-regulation (RANAS) model (Mosler, 2012; Mosler & Contzen, 2016b). The HAPA (Schwarzer, 2008) and the RANAS model both include maintenance self-efficacy as a concept influencing behaviours in the long term. Nevertheless, health theories do

not often focus on the persistence of changes in the longer term (Lally & Gardner, 2013) and the psychological processes that guide the maintenance of behaviour changes need more attention (Rothman, 2000).

Nearly the half of people's everyday behaviour is repeated behaviour, which usually takes place in the same context (Wood, Quinn, & Kashy, 2002). This offers a large potential for habit formation, which may make health behaviours more resistant to unhealthy lapses (Lally, Chipperfield, & Wardle, 2008; Rothman, Sheeran, & Wood, 2009). Hygiene-related behaviours are also very likely to become habitual, because they involve key features of habit, such as unconscious actions that are triggered automatically by contextual cues. This is seen as "reflexive" action (Neal, Vujcic, Hernandez, & Wood, 2015; Wood & Neal, 2007). The already existing habits are likely to block initial change in handwashing behaviour and are responsible for relapse after achieved initial behaviour changes. Therefore, the disruption of existing habits and the enabling of new behaviours to become habits are crucial for a sustained handwashing behaviour. The same authors criticized the fact that most handwashing interventions only target conscious, "reflective" drivers of behaviour, such as knowledge, social norms, and attitudes, which alone are often not sufficient to initiate behaviour change, especially not sustained behaviour change. People's daily practices in handwashing-relevant situations, such as toilet use and food preparation, are mainly driven by habit and not by conscious reflection. These existing habits are likely to block initial change in handwashing behaviour and are responsible for relapse after initial behaviour changes have been achieved. Therefore, the disruption of existing habits and enabling new behaviours to become habits are crucial for sustained handwashing behaviour. Efficient interventions to achieve sustained handwashing behaviour need to be based on both reflective and reflexive drivers (Neal et al., 2015).

3.4 Intention and willingness

Behaviour intention is the motivation of a person and how hard that person is willing to try to perform the behaviour. The general assumption is that the stronger the intention to engage in a behaviour, the more likely should be its performance (Ajzen, 1991). Several social cognition models assume that an individual's intention to engage in a behaviour (e.g. "I intend to wash my hands with soap and water before preparing food") is the most important predictor for behaviour change (Ajzen, 1985; R. W. Rogers, 1975). The HAPA model states that before

changing unhealthy habits, people they need to become motivated to do so by a process leading toward an explicit intention (Schwarzer, 2008). Sheeran (2002) found in his review of intention–behaviour relations that intentions could on average explain 28% of the variance in behaviour. Other meta-analyses (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Conner & Norman, 2005; Hagger, Chatzisarantis, & Biddle, 2002) also found variance explanations of between 20% and 30% for health behaviours. This phenomenon is called the "intention–behaviour gap" (e.g. Knoll et al., 2011) and it represents a criticism of the theories and models that assume intention to be the most proximal factor of behaviour. This leads to the question which other variables might be taken into account to bridge the intention–behaviour gap. Orbell and Sheeran (1998) found that people with positive intentions who did not act and people who acted despite intentions not to do so (Sheeran, 2002) were responsible for the intention–behaviour gap. Of these two groups, those participants who failed to act despite their positive intentions were particularly responsible for the intention–behaviour gap, whereas the motivation did not differ between the participants. A conclusion of this result was that the intention–behaviour gap does not come from the difficulty in forming a behavioural intention, but rather from implementing it in behavioural performance. Ajzen (1991) and Heckhausen (1989) had already suggested that behavioural intention can only be implemented in behaviour if the behaviour is under volitional control. Non-motivational factors (Ajzen, 1985) such as the availability of opportunities and resources (e.g., time, money, skills) and behavioural control (Kuhl, 1986) play an important role in the performance of many behaviours (Knoll et al., 2011). Lippke and colleagues (2004) found in their study of patients in rehabilitation settings and social-cognitive determinants in the adoption and maintenance of exercise that perceived self-efficacy and outcome expectations predicted levels of intention and action plans. They therefore argue that planning helps to bridge the intention–behaviour gap. To overcome the inconsistency between what people say and what they do, other types of measures were taken into account, such as implementation intentions and behavioural willingness (F. Gibbons, 2006). The idea of implementation intentions comes from Gollwitzer (1999) and seeks to increase the predictive power of intentions by making them more concrete, for instance by asking *when, where* and *how* the behaviour will be performed. Forming these specific intentions is assumed to be most important for complex health behaviours that are linked to situational cues (F. Gibbons, 2006).

The construct of behavioural willingness has been developed to improve the prediction of risky health behaviour. When asked, many people say they have no intention of engaging in

behaviours that put their health at risk. Nevertheless, many of them do when the opportunity arises. Behavioural willingness is defined as an openness to risk opportunity or as what an individual is willing to do under certain circumstances (Gibbons & Gerrard, 1997). To measure behavioural willingness, risk-conducive situations are described, then several possible responses, each depicting an increasing level of risk. Intention and behavioural willingness are highly correlated; nevertheless, behavioural willingness explains greater variance in the behaviour, from 2% to 10% (F. X. Gibbons, Gerrard, & Lane, 2003). Behavioural willingness is usually better at predicting health risk behaviour for adolescents than intention (F. X. Gibbons, Gerrard, Ouellette, & Burzette, 1998). However, for adult risk behaviour, or for people with more experience with the target behaviour, behavioural willingness shows weaker results, so it is thought that intention is a better predictor of adult risk behaviour than behavioural willingness (Pomery, Gibbons, Reis-Bergan, & Gerrard, 2009). For two of the studies of this dissertation, behavioural intention and willingness to follow two prevention instructions, to report a suspected case via the Ebola hotline and not to touch someone who might be suffering from EVD, were used as outcome variables, because there were no cases of EVD in the study countries, Guinea-Bissau and the Gambia.

3.5 Theories and frameworks for health behaviour change in developing countries

Numerous approaches have been developed for practitioners to increase the compliance of their target population with social interventions that enable behaviour change (Mosler, 2012; Peal, Evans, & Van der Voorden, 2010). Aboud and Singla (2012) emphasize in their critical overview of research on health behaviour change in developing countries the combination of theory, evidence, and insights about the target population to identifying which behaviour to change and how to change it. However, the authors found that developmental health programmes rarely rely on these three sources. Instead, they are often based on logical frameworks that incorporate the simple assumption that interventions activities lead to the desired outcome behaviours. Evidence of the relation between interventions, behaviour change, and theories is needed to overcome this gap. A number of theoretical models and frameworks have recently emerged to explain and guide health behaviour change in the WASH sector and to design behaviour change interventions in developing countries (e.g. Dreibelbis et al., 2013; Mosler, 2012). One difference between the social-cognitive theories and models of health behaviours and behaviour change is that the context and the role of the physical and natural

environment is of higher relevance. The following section provides an overview of such theories and frameworks. Again, all the theories and frameworks it describes involve threat.

3.5.1 The integrated behavioural model for water, sanitation and hygiene

The integrated behavioural model for water, sanitation, and hygiene (IBM-WASH; Dreibelbis et al., 2013) resulted from a systematic review of nine WASH-specific theoretical models, behaviour change frameworks, and programmatic models. It is a framework for designing and evaluating behaviour change interventions in infrastructure-restricted settings, including the promotion and provison of low-cost technologies that enable improved WASH in low-income countries (Dreibelbis et al., 2013). Three main critiques of the existing models were mentioned by the authors: the potential role of technology factors in influencing behavioural outcomes is not taken into account sufficiently; the focus is on behavioural determinants at the individual level; and the role of the physical and natural environment has been neglected. IBM-WASH is a multi-level model that takes the form of a matrix with three intersecting dimensions (columns) and five levels (rows; see Table 1). Thus, it contains 15 fields that influence WASH behaviours. The authors propose to use the framework as a checklist for planning a behavioural intervention. The dimensions are contextual factors, psychosocial factors, and technology factors. The five levels are societal/structural, community, interpersonal/household, individual, and habitual. The approach has so far been used to design a handwashing station for infrastructure-restricted communities in Bangladesh (Hulland et al., 2013), to evaluate a WASH project in Nepal (McMichael & Robinson, 2016), and to explain filter use in Bangladesh (Najnin et al., 2015).

Table 1: The Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH)

Levels	Contextual Factors	Psychosocial Factors	Technology Factors
Societal/ Structural	Policy and regulations, climate and geography	Leadership/advocacy, cultural identity	Manufacturing, financing, and distribution of the product; current and past national policies and promotion of products Location, access, availability, individual vs. collective ownership/access, and maintenance of the product
Community	Access to markets, access to resources, built and physical environment	Shared values, collective efficacy, social integration, stigma	
Interpersonal/ Household	Roles and responsibilities, household structure, division of labour, available space	Injunctive norms, descriptive norms, aspirations, shame, nurture	Sharing of access to product, modelling/demonstration of use of product
Individual	Wealth, age, education, gender, livelihoods/employment Favourable environment for habit formation, opportunity for and barriers to repetition of behaviour	Self-efficacy, knowledge, disgust, perceived threat	Perceived cost, value, convenience, and other strengths and weaknesses of the product
Habitual		Existing water and sanitation habits, outcome expectations	Ease/effectiveness of routine use of product

3.5.2 The Focus on Opportunity, Ability, and Motivation framework

The Focus on Opportunity, Ability, and Motivation (FOAM) framework has been specifically developed by the World Bank's Water and Sanitation Programme[8] to analsze handwashing

[8] The Water and Sanitation Programme is a multi-donor partnership administered by the World Bank to support poor people in obtaining affordable, safe, andsustainable access to water and sanitation services.

behaviour and to design effective handwashing programmes (Coombes & Devine, 2010). An adapted version of this framework is SaniFOAM (Devine, 2009) for sanitation-related behaviours and for planning sanitation programmes. Both behavioural frameworks organize behavioural determinants into three main domains: opportunity to improve the behaviour, ability to change the behaviour, and motivation to change the behaviour. This classification is often used for developing social marketing campaigns or for understanding consumer behaviour (Thøgersen, 1995). Focus includes the definition of the target population and the target behaviour to be changed. Opportunity covers the resources required by an individual to perform a certain behaviour and includes social norms, product attributes, and access to or availability of products or services. Opportunity determinants are derived from the Diffusion of Innovation theory (E. M. Rogers, 2010) and are often the factors over which an individual has less control because they are external, such as institutional or structural factors influence an individual's chance to perform a behaviour. The ability determinants describe whether an individual is able to perform the behaviour and include factors such as knowledge, self-efficacy, and social support. Motivation determines whether an individual has a self-interest in performing a certain behaviour. This self-interest contains beliefs and attitudes, outcome expectations, personal risk assessment or threat, and intention. The ability and motivation determinants come mostly from social cognition models of behaviour change. The conceptual framework is displayed in Figure 7. Compared to the IMB-WASH model (Dreibelbis et al., 2013) and the RANAS model (Mosler & Contzen, 2016b), contextual factors are emphasized less, although they are considered in the opportunity part of the framework. Important factors such as self-efficacy determinants are missing from the FOAM framework.

So far, the social-cognitive theories and frameworks for health behaviours and behaviour change outlined show numerous similarities and differences. The next chapter presents an integrative approach that combines constructs from competing theories into a more comprehensive model: the risks, attitudes, norms, abilities, and self-regulation model of behaviour change (Mosler, 2012; Mosler & Contzen, 2016b).

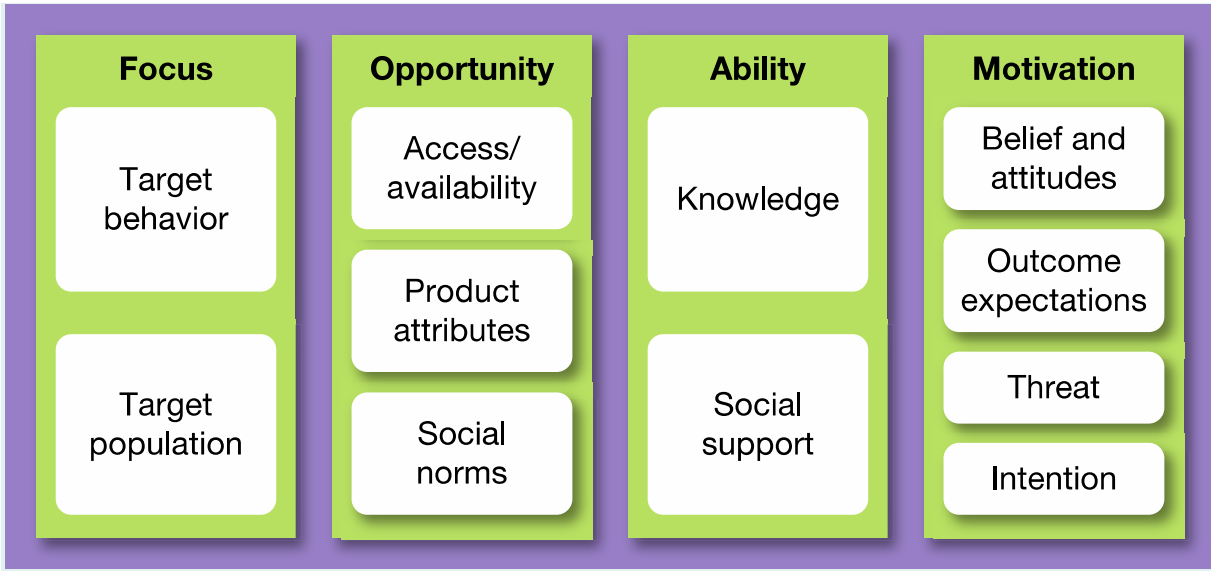

Figure 7: *FOAM Framework (Coombes & Devine, 2010).*

3.5.3 The risks, attitudes, norms, abilities, and self-regulation model of behaviour change

The risks, attitudes, norms, abilities, and self-regulation (RANAS) model (Mosler, 2012; Mosler & Contzen, 2016b) of behaviour change is a conceptual model to explain change in WASH behaviour and a systematic approach to behaviour change interventions for the WASH sector in developing countries. The RANAS approach can also be used as a guideline to develop and evaluate health behaviour change campaigns. Although originally developed to change WASH behaviours in developing countries, it is applicable to a range of behaviours in various settings and populations (Mosler & Contzen, 2016b). It integrates key constructs from major social-cognitive theories and aims to overcome the shortcomings of existing frameworks in the sector by providing a more comprehensive set of behaviour-predicting social-cognitive factors. As shown in Figure 8, the RANAS model groups the psychosocial[9] factors in five blocks: (1) risk factors; (2) attitude factors; (3) norm factors; (4) ability factors; and (5) self-regulation factors. Mosler (2012) considers these factor blocks to be predictive of three outcomes: behaviour, intention, and habit strength. Furthermore, the RANAS approach enables consideration of the underlying determinants of the desired behaviour and the competing behaviours, for instance not only washing hands at critical times (behaviour A) but also not washing hands at critical times (behaviour B).

[9] The revised version of the RANAS approach (Mosler & Contzen, 2016b) uses the term psychosocial factor for social-cognitive factors.

The risk factor block represents an individual's understanding and awareness of the health risk. This factor block distinguishes between the perceived vulnerability (Rosenstock, 1974) and perceived severity (R. W. Rogers, 1975) of a health threat. Additionally, an individual should have an understanding of the symptoms of a disease, its transmission, and its prevention, which is represented as factual knowledge in the model (Bandura, 2004; Schwarzer, 2008).

The second factor block comprises attitude factors (Ajzen, 1991; Fishbein & Ajzen, 2011), which express a positive or negative stance towards a behaviour. Attitude factors include instrumental and affective beliefs. Instrumental beliefs are opinions about the costs of a behaviour, such as time, monetary costs, and effort, and the benefits of a behaviour, such as savings, health, and other advantages of the behaviour. Affective beliefs are the feelings that arise when performing or thinking of the behaviour (Trafimow & Sheeran, 1998).

The norm factor block is concerned with descriptive, injunctive, and personal norms and represents convictions about the incidence of a behaviour and the opinion of the social network about the behaviour (Cialdini, Reno, & Kallgren, 1990). Descriptive norms refer to the perception of what others typically do (e.g., whether family members wash their hands with soap). Injunctive norms reflect perceptions of which behaviours are typically approved or disapproved of by important others (Cialdini et al., 1990). Important others are people from the close social network, such as relatives, friends, and neighbours, but this grouping also includes recognized authorities such as village leaders, traditional healers, and religious or other institutional leaders. Finally, the personal norm reflects what a person believes that he or she should do (Schwartz, 1977).

The ability factor block contains factors that represent an individual's confidence in her or his ability to practice a behaviour and to handle and overcome barriers. Ability factors include action knowledge (Bandura, 1991), meaning knowing how to perform a behaviour, which is seen as a precondition of performing the behaviour (Frick, Kaiser, & Wilson, 2004). Further, the ability factors cover different types of self-efficacy: self-efficacy, meaning a person's expectations about her or his own competence and resources to successfully perform a behaviour (Bandura, 1991); maintenance self-efficacy, meaning the belief in one's abilities to deal with barriers during the maintenance of a new behaviour; and finally recovery self-efficacy, which represents the confidence of an individual in returning to the intended behaviour after a relapse (Schwarzer, 2008).

The fifth factor block comprises the self-regulation factors, which support an individual in managing conflicting goals and distracting cues when intending to implement and maintain a behaviour. Action control represents a person's attempts to self-monitor a behaviour (Schwarzer, 2008). Action planning refers to a person's attempts to plan a behaviour's execution through detailed planning of when, where, and how the behaviour will be performed (Gollwitzer, 1993, 1999). Coping planning can help to overcome barriers which would impede the behaviour and to plan responses accordingly (Sniehotta, Schwarzer, Scholz, & Schüz, 2005). Finally, remembering, and commitment have been found as crucial for sustained behaviour performance (Tobias, 2009).

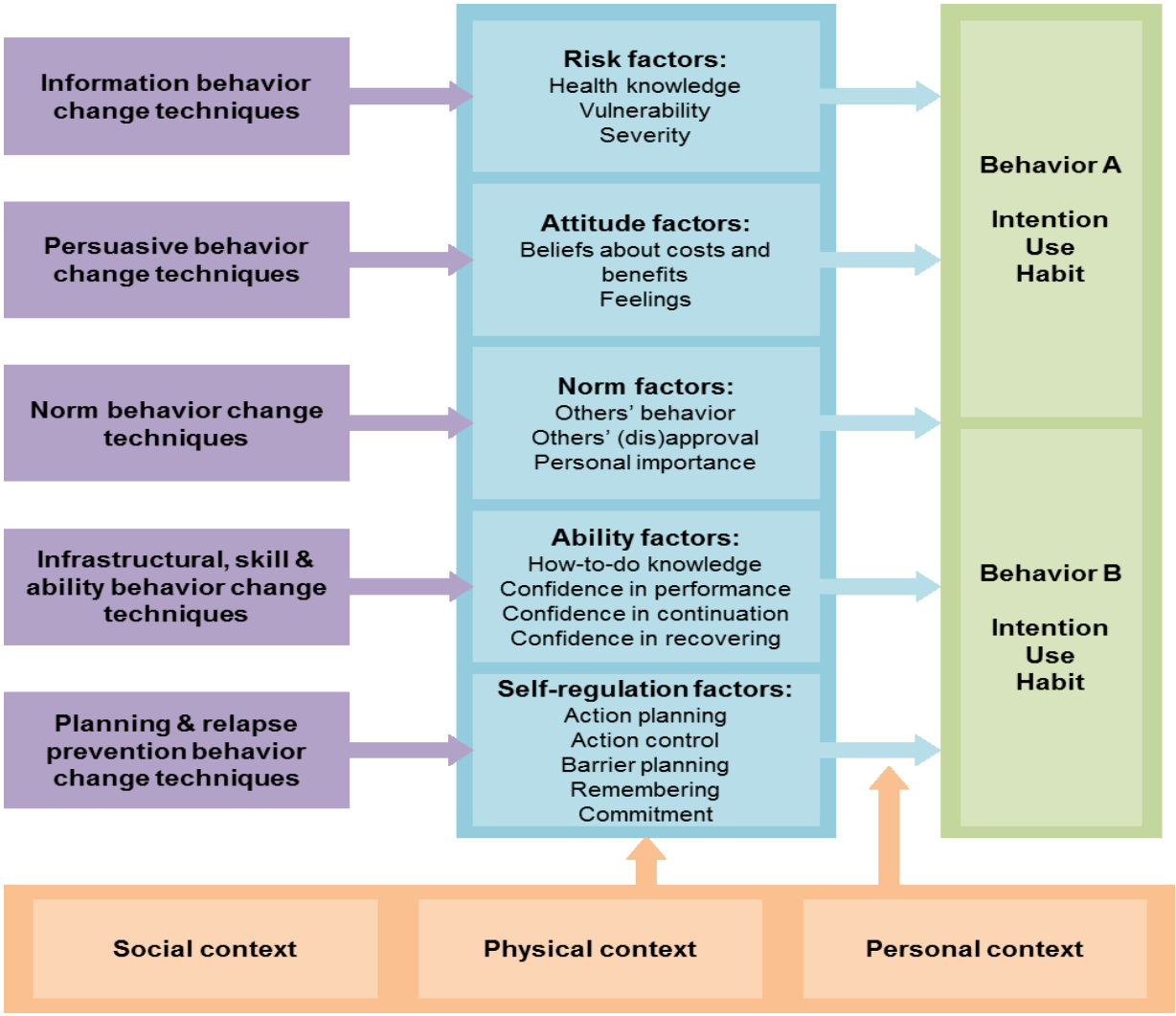

Figure 8: *The extended RANAS Model of Mosler and Contzen (Mosler & Contzen, 2016b)*

The extended version of the RANAS model (Mosler & Contzen, 2016b) also incorporates contextual factors, which are assumed to influence behaviour via the psychosocial factors

through mediation and moderation. For instance, a person with low income might evaluate the cost of soap for handwashing as higher than would a person with high income. Contextual factors may also alter the behavioural factors' influence on behaviour; a person might be strongly committed to washing hands with soap at critical times, but the commitment may not translate into behaviour due to lack of access to a hand washing facility. The contextual factors can be divided into three categories: social, physical, and personal. The social context is constituted by culture and social relations, laws and policies, economic conditions, and the information environment. The physical context consists of the natural and built environment. Finally, the personal context is formed by socio-demographic factors such as age, gender, and education and by the physical and mental health of the person.

The RANAS approach (Mosler & Contzen, 2016b) provides a tool for designing behaviour change campaigns. The approach suggests first measuring the psychosocial factors and the behaviour with a quantitative survey. Then, the psychosocial factors with the highest intervention potential, meaning factors with low mean scores and high predictive values on the behaviour within the target population, are identified using statistical analysis. Besides the factor blocks and the behavioural factors, the model contains behaviour change techniques (BCTs) that correspond to the factor blocks. By changing the underlying psychosocial factors, the target behaviour can be changed. The key psychosocial determinants are linked with the corresponding BCTs and combined with a communication channel, such as poster, leaflets, theaters, songs, radio spots, movies, stickers, paintings, community meetings, or household visits of promoters, to create appropriate behaviour change strategies. The last phase of the systematic behaviour change approach is the implementation and evaluation of these behaviour change strategies.

Although the RANAS model considers a wide range of potentially relevant factors, it does not specify the relations between the predictors. Such a causal connection might provide additional insights relevant for behaviour change interventions (Michie, Rothman, & Sheeran, 2007; Schwarzer, 2014). Other theories (Dreibelbis et al., 2013; Flay et al., 2009) have also suggested that the effectiveness and sustainability of interventions might differ when they target behaviour-distal or behaviour-proximal psychosocial factors.

The applicability of the model has been demonstrated in various studies to explain WASH behaviours (e.g. Contzen & Mosler, 2015; Inauen, Tobias, & Mosler, 2013a; Seimetz, Boyayo, & Mosler, 2016; Sonego & Mosler, 2014; Stocker & Mosler, 2015) and has been used

successfully to promote WASH behaviours (e.g. Contzen, Meili, & Mosler, 2015; Huber, Tobias, & Mosler, 2014; Inauen & Mosler, 2014).

The operationalisation of the psychosocial factors of the studies in this thesis was based on the RANAS model.

4 Theory-based behaviour change

Theory-based behaviour change interventions has been found to be more effective than interventions that are not theory-based (e.g. Aboud & Singla, 2012; Baranowski et al., 1997; Fishbein & Cappella, 2006; Glanz & Bishop, 2010). Theory-based behaviour change interventions involve identifying behavioural determinants, combining these determinants with BCTs, then measuring the effectiveness and mode of operation of the interventions (Mosler & Contzen, 2016b). The fundamental assumption of theories and models of health behaviour is that health behaviours are driven by social-cognitive factors, because behaviour is assumed to be primarily caused by people's perceptions of objective conditions. The objective conditions themselves are seen as secondary, and social-cognitive factors are seen as more changeable than other intrinsic factors such as personality (Conner & Norman, 2009). Numerous factors have been associated with individual health behaviour: intrinsic factors such as socio-demographic variables, personality characteristics, and social-cognitive behavioural factors (Conner & Norman, 2009) and extrinsic factors such as policy and regulations, climate and geography, access to resources, the built and physical environment, the available infrastructure, culture, and social groups (e.g. Dreibelbis et al., 2013; Sallis, Owen, & Fisher, 2015).

In order to change a target behaviour, interventions have to change the factors that underlie that behaviour. Additionally, several researchers have emphasized the need to focus on the determinants of a behaviour that are key in a specific population or context (Abraham, 2012; Eldredge, Markham, Ruiter, Kok, & Parcel, 2016; Mosler, 2012). The key behavioural determinants are selected and addressed through BCTs. The RANAS approach provides a catalogue of BCTs (Mosler & Contzen, 2016a) which indicates which BCTs address specific psychosocial factors. Suitable communication channels are chosen and combined with the BCTs. The BCTs and the communication channels together form a behaviour change strategy. Knowing the underlying psychosocial determinants of a health behaviour is not only essential for developing effective behavioural interventions but also for evaluating them (Conner & Norman, 2009; Lippke & Ziegelmann, 2008). An intervention's effectiveness can be observed through impact evaluation. However, it is important to know not only whether a promotional activity increased behaviour but also to understand the reasons for this effect. This requires examination of the change processes underlying interventions (Michie & Abraham, 2004). Examining which of the underlying factors have been tackled by a promotional activity allows the effectiveness of an intervention to

be investigated, and the intervention can then be improved accordingly (Lippke & Ziegelmann, 2008).

5 Evidence base for prevention behaviours in emergency and outbreak situations

A sound evidence base is needed that effective and interpretable interventions to reduce risk behaviours and to promote prevention behaviours can be developed (Lippke & Ziegelmann, 2008). The promotion of WASH-related and other behaviours is an important aspect of environmental health in camps or elsewhere during emergencies and outbreaks. Nevertheless, most relief organizations do not pay sufficient attention to this topic, and greater emphasis on hygiene and other health promotion is needed in public health responses to emergencies and outbreaks (Parkinson, 2009). Evidence is lacking for the effectiveness of behaviour change campaigns in emergency and outbreak situations (Brown et al., 2012; Contzen & Mosler, 2013; Vujcic et al., 2015). WASH interventions in such situations are often designed using knowledge gained in the development sector (Brown et al., 2012; Parkinson, 2009), but it is unclear to what extent this knowledge is relevant to emergency and outbreak situations (Parkinson, 2009). More empirical studies are needed to ensure that effective interventions are implemented during emergencies and outbreaks. Effective interventions in both emergency and outbreak settings and longer-term development settings are known to include safe water provision, safe excreta disposal, and hygiene measures (Brown et al., 2012). The need for behaviour change campaigns to accompany innovations, new services, and the dissemination of new behaviours (e.g. calling an Ebola hotline, hygiene practices) is also increasingly recognized, as in most cases these are not self-promoting (Brown et al., 2012; Mosler, 2012; E. M. Rogers, 2010). But despite the improved outcomes of interventions based on theories or theoretical frameworks (e.g. Aboud & Singla, 2012; Baranowski et al., 1997; Fishbein & Cappella, 2006; Glanz & Bishop, 2010), their use in the development and evaluation of behaviour change interventions remains rare (Dreibelbis et al., 2013; Lippke & Ziegelmann, 2008). Whether the effectiveness of interventions is influenced by emergency and outbreak situations is as yet unclear (Brown et al., 2012; Parkinson, 2009; Vujcic et al., 2015).

5.1 Lack of evidence in emergency and outbreak contexts

Vujcic and colleagues (2015) found in interviews with WASH experts that socioeconomic, religious, and demographic factors influence previous handwashing behaviour and also the

extent to which individuals are willing to change behaviours. These authors also found a stronger focus on the implementation of technical aspects than on behavioural aspects in handwashing promotion. Further, they found that the unique nature of each emergency limits the effectiveness of prototype strategies. The lack in the evidence base for WASH and other prevention interventions in emergency and outbreak situations is related to responses to such situations. Social, physical, and environmental contexts vary widely, and the conditions may change rapidly (Parkinson, 2009). This indicates the importance of taking into account the specific local context and making behavioural change approaches contextually appropriate, which often does not occur due to the nature of emergencies and outbreak situations (Aboud & Singla, 2012; Vujcic et al., 2015). For example, risk factors that have generally been found to have little influence on hygiene behaviours seem to be important behaviour determinants in refugee camps (Vujcic et al., 2015) or during outbreaks of diseases (e.g. Curtis et al., 2009). Before developing interventions, WASH professionals need baseline surveys about habitual handwashing behaviours, the understanding of hygiene and the benefits of handwashing, and prior exposure to hygiene-related media campaigns (Vujcic et al., 2015). In reality, relief agencies often make assumptions about which motivators encourage change in handwashing behaviours, and these assumptions are not adapted over time. In most cases, handwashing promotion approaches in humanitarian settings focus on disease avoidance and health benefits as key motivators (Vujcic et al., 2015).

No theory-based studies reporting social-cognitive determinants of EVD prevention behaviours were found in a thorough search of relevant literature. A few surveys on knowledge, attitude, and practices (KAP) exist for EVD prevention behaviours. However, the majority of these KAP surveys do not report any predictors of EVD prevention behaviours. A KAP survey from Liberia showed that variables such as having a higher education, living in an urban area, being married, being a frequent radio listener, participating more often in community activities and having lower risk perception were significantly associated with avoiding physical contact with others in general and with a suspected person. People who had a high radio listening frequency, people living in urban areas, and people with a low risk perception, meaning those that perceived no or low risk, reported more disinfectant handwashing than those that had higher risk perceptions. The study revealed that at the height of the EVD crisis handwashing became mandatory before entering many Liberian public spaces, which reflects a structurally imposed change (The Liberia Ministry of Health, 2015).

The majority of studies about contextual and social-cognitive determinants of handwashing behaviour are from developed countries, and they have mainly been conducted with healthcare workers (e.g. Abdella et al., 2014; Curtis & Cairncross, 2003; Whitby, McLaws, & Ross, 2006; Whitby et al., 2007). Some studies investigate the determinants of nonprofessional handwashing in developing countries (Aunger et al., 2010; Curtis et al., 2011). Most of these studies have been conducted with female primary caregivers, since they are primarily responsible for childcare and preparing food and thus have the highest chance of spreading, for instance, diarrheal disease to the family (Contzen & Mosler, 2015; Vujcic et al., 2015), or with schoolchildren (Seimetz, Slekiene, Friedrich, & Mosler, 2017). However, empirical evidence of the determinants of handwashing compliance among healthcare professionals or schoolchildren cannot be generalized to a general population of adults.

One study specifically investigated the role of fear and the spread of EVD during the 2014-2016 outbreak (Shultz et al., 2016). They concluded that, during an outbreak, fear frequently transforms into action or inaction and manifests as fear-related behaviours. These behaviours can then accelerate the spread of disease, impeding life-saving interventions for EVD - infected persons and patients with other serious medical conditions, increasing psychological distress and disorder, and exacerbating social problems. One of the most devastating consequences of fear-related behaviours during the EVD outbreak was the decision of infected persons to avoid treatment centres and to stay at home for care, which accelerated the spread of the disease by decreasing their personal chances of survival, and by increasing their encounters with others, who were then at high risk of infection. Numerous admitted patients reportedly fled from the treatment units, carrying the disease back into the communities (Shultz, Baingana, & Neria, 2015). After the problem of home deaths arose in 2014, Allan and colleagues (2015) launched a rapid anthropological assessment of this phenomenon. They conducted a series of focus groups and interviews with key informants to identify factors associated with delayed healthcare-seeking and home deaths. Their findings showed that several factors contributed to delayed healthcare-seeking and home deaths among suspected and confirmed EVD cases: concerns about the quality of care in treatment centres, lack of information about EVD treatment units, strong opposition to cremation, concerns about being subjected to EVD related stigma, fear of household quarantine, and fear about lack of food for the family while under quarantine restrictions.

5.2 The RANAS social-cognitive determinants of disease prevention behaviour in developing countries

As the empirical studies of this thesis used the theoretical background of the RANAS model (Mosler & Contzen, 2016b), an overview is presented in the following of the impact of the psychosocial determinants of the RANAS model on different behaviours in developing countries. Most of the studies that used the RANAS model were carried out in development contexts. One study was conducted in displacement camps and low-income neighbourhoods in Port-au-Prince, Haiti, during the recovery phase of an earthquake and cholera outbreak in October 2010 (Contzen & Mosler, 2013; Contzen & Mosler, 2015). Another study was part of a drought mitigation response in rural southern Ethiopia (Contzen & Mosler, 2015), and one other is about water treatment in Chad to prevent cholera outbreaks (Lilje, Kessely, & Mosler, 2015).

5.2.1 Risk factors

Aunger and colleagues (2010) found that a perceived threat predicted handwashing only during cholera epidemics (Aunger et al., 2010), which is in line with Curtis and colleagues' (2009) findings about perceived vulnerability in a review of formative research on handwashing in eleven countries. Contzen and Mosler (2015) revealed inconclusive results for risk factors for handwashing behaviour in Haiti and Ethiopia. Sometimes they were not related to handwashing, sometimes positively so, and sometimes even negatively. A negative association between perceived vulnerability and handwashing was also found in another handwashing study (Devine, Karver, Coombes, Chase, & Hernandez, 2012) as well as for other health behaviours, such as exercising and cancer screening (Norman, Boer, & Seydel, 2005). Reverse causality might be the reason for this finding: people who protect themselves by washing hands often feel less vulnerable to contracting diseases such as diarrhea and EVD. The perceived severity of the consequences of diarrhea was a predictor for handwashing in Burundi (Seimetz, Boyayo, et al., 2016; Seimetz, Kumar, & Mosler, 2016). Biran and colleagues (2009) found in their evaluation of a soap promotion and hygiene education campaign on handwashing behaviour in rural India that knowledge of germs increased, but handwashing behaviour at critical junctures did not. In a study about factors determining water treatment behaviour for the prevention of Cholera in Chad, personal risk perception was among the most important factors affecting water treatment behaviours (Lilje et al., 2015).

5.2.2 Attitudes

Two attitude factors, disgust at having dirty or contaminated hands and nurture, meaning the motivation of mothers to keep their children healthy, were among the strongest predictors for handwashing in developing countries (Aunger et al., 2010; Contzen & Mosler, 2015; Curtis et al., 2009; Devine & Koita, 2010; Steadman Group, 2007). A study from Kenya found that a lack of cognitive concern about the cost of soap use predicted observed handwashing behaviour (Aunger et al., 2010). Other studies found instrumental beliefs not to be significantly related to handwashing or with only a small predictive power (Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016). In a study conducted in Peru, affective and instrumental beliefs were significantly associated with having a handwashing station (Devine et al., 2012). A multi-country study about psychosocial determinants of safe drinking water consumption behaviours revealed that both instrumental beliefs about costs and benefits and affective beliefs such as taste are important in a majority of cases. However, affective beliefs varied more strongly, both for different target behaviours and between specific settings and populations, and are thus to be evaluated from case to case (Lilje & Mosler, 2017).

5.2.3 Norm factors

Norm factors have been consistently identified as highly relevant to several prevention behaviours in developing countries (Lilje & Mosler, 2017; Mosler, 2017). The study about factors determining water treatment behaviour for the prevention of cholera in Chad (Lilje et al., 2015) found that both social norms and encouragement by the authorities and influential persons were the most important factors affecting water treatment behaviours. In particular, the factors of descriptive and injunctive norm perceptions revealed the greatest differences between performers and nonperformers of water treatment. The studies by Devine and Koita (2010) in Senegal and by Contzen and Mosler (2015) in Haiti and Ethiopia also cited injunctive and descriptive norms as key predictors of handwashing. The descriptive norm was associated with the presence of a designated place for handwashing in Senegal (Devine et al., 2012), and this norm was emphasized in the eleven-country review by Curtis and colleagues (2009). Longitudinal evidence for norm factors and handwashing has been reported in two studies; increases in the injunctive norm led to a higher intention to wash hands in a study conducted in India (Seimetz, Kumar, et al., 2016), and increases in the descriptive norm resulted in a higher handwashing frequency in a study conducted in Ethiopia (Contzen & Inauen, 2015).

5.2.4 Ability factors

Self-efficacy was an important predictor of handwashing in Ethiopia, Haiti and Burundi (Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016) and increases in self-efficacy resulted in a higher handwashing intention in a study conducted in India (Seimetz, Kumar, et al., 2016). The perception of impediments, meaning feeling hindered from washing hands by barriers and distractions, was highly relevant to handwashing in Haiti and Ethiopia (Contzen & Mosler, 2015). Studies about the association of having a designated place for handwashing where soap and water are accessible have confirmed this relation between hindrance and handwashing (Devine et al., 2012; Luby et al., 2009). Action knowledge and perceived self-efficacy were shown to be the most common explaining factors for safe water practices in the multi-country review about the determinants of safe drinking water consumption behaviours (Lilje & Mosler, 2017).

5.2.5 Self-regulation factors

Comparatively little research has examined the role of self-regulatory strategies in initiating and sustaining handwashing practices. Seimetz and colleagues (2016) found in Burundi that planning how, when, and where to wash hands and always remembering to do so were the main predictors for handwashing. In Haiti and Ethiopia (Contzen & Mosler, 2015) , coping planning and commitment emerged as relevant for handwashing behaviour, and in India and Ethiopia, changes in commitment resulted (Contzen & Inauen, 2015; Seimetz, Kumar, et al., 2016) in an increase in the intention to wash hands.

5.3 Context factors

The relevance of contextual factors to WASH behaviours has been emphasized by several researchers (Dreibelbis et al., 2013; Mosler & Contzen, 2016b; Seimetz, Boyayo, et al., 2016). External factors such as infrastructure, distance from the water source, the quantity of water and soap available in the household, and household wealth are relevant for handwashing, while having a mobile phone and coverage were relevant for calling an Ebola hotline. A recent study from New Zealand examining perceptions and knowledge of EVD found that individual characteristics such as age, sex, and education were significant predictors for the variance in the number of named protective behaviours (Petrie, Faasse, & Thomas, 2016). Having access to running water has been found to be related to higher handwashing frequen-

cies (Pickering & Davis, 2012) as has having a designated place to wash hands (Devine et al., 2012; Scott, Lawson, & Curtis, 2007). Extensive investigations into the associations of contextual factors with handwashing frequency have been conducted by Seimetz (2015) and Seimetz and colleagues (2016); both studies found that self-reported handwashing was not explained by factors such as age, education level, or marital status. In contrast, other researchers have found that higher education level and higher age are significantly related to self-reported handwashing frequencies (Tao, Cheng, Lu, Hu, & Chen, 2013; Tüzün, Karakaya, & Deniz, 2015). Seimetz and colleagues (Seimetz, Boyayo, et al., 2016) found that household wealth, the amount of water per person, and having a designated place for washing hands significantly predicted handwashing frequency. Wealth was also repoorted to be relevant in other handwashing studies (e.g. Biran, Tabyshalieva, & Salmorbekova, 2005; Halder et al., 2010; Luby & Halder, 2008; Luby et al., 2009; P. K. Ram et al., 2010). However, Seimetz and colleagues (Seimetz, Boyayo, et al., 2016) found that when the psychosocial factors were included in the model, wealth was no longer significantly associated with handwashing frequency; however, the amount of water available remained a significant predictor.

Several studies have found that contextual factors could not explain much of the variance of the reported behaviours. The addition of psychosocial factors to the models resulted in a major increase in their explanatory power (Seimetz, Boyayo, et al., 2016; Stocker & Mosler, 2015). Similar results were reported from a multi-country study about household safe water consumption (Lilje & Mosler, 2017). It may therefore be argued that some external factors are subsumed within the psychosocial factors. For example, the effort required by a long distance to the water source may be represented by high instrumental beliefs, which is a psychosocial factor. Other contextual factors, such as having access to soap, having a handwashing station, or a working mobile phone to call the Ebola hotline, might be represented in the perceived ability to perform a target behaviour. Nevertheless, some contextual factors have been considered in the Studies 1 and 3 of this thesis.

The following section presents the research questions and then describes the studies that constitute the empirical element of this thesis.

6 Objectives and research questions

This thesis aims to contribute to the understanding of EVD prevention behaviours. In particular, the goal of this thesis is to understand the effect of an outbreak situation on people's cognitions and the associations of these cognitions with several EVD prevention behaviours. This is done by explaining EVD prevention behaviours in Guinea-Bissau and the Gambia and by testing the effectiveness and mode of operation of EVD prevention interventions in the Gambia. The studies of this thesis used the RANAS model (Mosler & Contzen, 2016b) to identify the social-cognitive determinants of the EVD prevention behaviours.

Three studies were conducted, from which the goals of this thesis can be derived: (1) to investigate which contextual and psychosocial factors steer compliance with EVD prevention instructions; (2) to evaluate EVD response interventions to see whether the interventions successfully tackled the key determinants of the prevention behaviours; and (3) to determine contextual and psychosocial predictors of handwashing habits during an EVD outbreak to develop more effective handwashing intervention programmes and achieve more sustained handwashing behaviour.

The following sections present the specific research questions.

6.1 Identifying determinants of Ebola prevention behaviours

Knowing the setting and the audience are critical for the success of behaviour change interventions (Aboud & Singla, 2012). The diversity of a population, their prior exposure to health promotion and their health behaviours before the outbreak situation, is highly relevant to behaviour changes (Vujcic et al., 2015). According to the RANAS model of systematic behaviour change (Mosler & Contzen, 2016b) the identification of underlying factors is a precondition for the development of effective behaviour change interventions (Mosler, 2012). Which factors are relevant may differ between populations due to differing contexts and developing status (Eldredge et al., 2016).

Study 1, presented in Chapter II of this thesis, aims to determine the contextual and psychosocial determinants of EVD prevention behaviours in an outbreak context. It reports the intention and willingness of the population to follow two EVD prevention behaviours: reporting

suspected cases to the Ebola hotline and not touching someone who might be suffering from EVD.

The research questions of interest are

(1) Which contextual factors predict the intention to follow EVD prevention instructions?
(2) Which are the crucial psychosocial factors for the intention to follow EVD prevention instructions?

The findings of this study enable the design of effective EVD prevention campaigns in a population that was and is at high risk of an EVD outbreak during an ongoing outbreak in the region. The goal of the study was to strengthen the country's preparedness in the face of a potential EVD outbreak.

6.2 Evaluation of Ebola response interventions

The effectiveness of hygiene promotion efforts in emergency and outbreak settings has not been adequately evaluated thus far. It is assumed that hygiene interventions in emergency relief and recovery work as they do in development contexts, but it is also assumed that an emergency or outbreak setting influences interventions' effectiveness (Parkinson, 2009; Vujcic et al., 2015). Study 2 of this thesis presented in Chapter III aims to assess the impact of handwashing promotions and EVD prevention promotions during an EVD outbreak. A cross-sectional survey was used to evaluate handwashing promotions and EVD prevention promotions implemented by affiliates of a local NGO in the Gambia. To change a behaviour successfully, promotion activities must target the psychosocial factors that steer that behaviour. It was tested whether the promotion activities had tackled the key psychosocial factors of the intention to report suspected cases to the Ebola hotline and of self-reported handwashing frequency.

Four research questions are addressed:

- Which are the crucial psychosocial determinants of handwashing with soap at critical junctures under the threat of EVD?
- Which are the crucial psychosocial determinants of the intention to call the Ebola hotline to report a suspected case of EVD?

- Which are the crucial psychosocial determinants of the intention not to touch someone who might be suffering from EVD?
- Which promotional activities are associated with which psychosocial factors and are through these factors associated with the preventive behaviours?

Although a correlative study only provides approximate insights into the effectiveness of hygiene and EVD prevention interventions during an outbreak, it adds evidence to public health practices in outbreak settings.

6.3 Investigating determinants of habitual behaviour and development of theory-based interventions

Chapter IV contains the third study of this thesis, which aims to explain habitual handwashing behaviour. Avoiding most health threats requires that healthy behaviours are maintained over time, and this includes handwashing. This study highlights the importance of integrating concepts such as habit in the design and development of behaviour change programmes.

The following research questions are investigated:

- Which contextual factors are related to habitual handwashing with soap and water at critical junctures during an EVD outbreak?
- Which psychosocial factors are related to habitual handwashing with soap and water at critical junctures during an EVD outbreak?

Further, we assume that risk factors, especially the perceived threat of EVD (perceived vulnerability and perceived severity), are associated with habitual handwashing.

The comparison of several disease prevention behaviours (reporting suspected cases to the Ebola hotline, not touching someone who might be suffering from EVD, self-reported handwashing frequency and handwashing habit) is important for the generalizability of the RANAS model in outbreak situations. The results of the studies in this thesis contribute to the evidence base of contextual and psychosocial factors associated with disease prevention behaviours during outbreaks of contagious diseases. If the contextual and psychosocial determinants are similar, this knowledge could be used to select determinants to address behaviours in future outbreak situations in other developing countries. If the determinants differ widely, the need for population-tailored programmes would be emphasized.

The next and final section of this chapter contains descriptions of the studies with which the research questions were investigated.

7 Description of the studies

Two surveys were conducted, one in Guinea-Bissau and one in the Gambia. Both surveys were cross-sectional. The data collected in these two surveys were the basis of the three empirical studies that constitute this thesis.

7.1 Background of the surveys and study areas

All three studies in this thesis were conducted in 2015 in Guinea-Bissau and the Gambia, while the outbreak of EVD was in full force in the neighbouring countries of Guinea, Sierra Leone, and Liberia.

The survey in Guinea-Bissau was initiated and funded by UNICEF Guinea-Bissau, and the survey in the Gambia was initiated and funded by Oxfam America. Both surveys were part of these organizations EVD response strategies, and the organizations were close collaboration partners throughout all phases of the surveys. The overall objective of the projects was to determine what contextual and psychosocial factors explain several EVD prevention instructions.

Guinea-Bissau (see Figure 9), which shares a border with Guinea, was at high risk throughout this period due to its proximity to the countries already affected; their borders are porous, often crossed by a fluid population moving in different directions, and often unchecked. Cross-border market activities, risky burial ceremonies, and poor WASH practices in many communities contributed to the country's vulnerability. In July 2015, the Emergency Committee convened by the Director-General of the World Health Organization therefore recommended strengthening Guinea-Bisseau's EVD preparedness as well as its prevention and response capacities (WHO, 2015). Thirty years of political instability has made the health system in Guinea-Bissau one of the weakest in the region and the most poorly resourced to tackle epidemics, including ones such as EVD. The collaboration partners of the funding organization UNICEF Guinea-Bissau in Guinea-Bissau were INASA (the National Institute of Public Health of Guinea-Bissau) and Nadel (the National Association for Local Development). In Guinea-Bissau, the study area consisted of all nine regions in the country: Tombali, Quinara, Oio, Biombo, Bijagos, Bafatá, Gabú, Cacheu, and Bissau.

Figure 9: *Map of Guinea-Bissau (UNITED NATIONS, 2012).*

While the Gambia (see Figure 10) does not border Guinea or either of the other affected countries, its geographical location in the middle of West Africa put it at high risk, and it has only limited resources to combat national health risks. The Republic of the Gambia is one of Africa's smallest countries and, except for its coastline on the Atlantic Ocean at its western end, surrounded by Senegal. The study area consisted of two critical regions, where Oxfam and their local partner INGO Concern Universal implemented EVD prevention activities: the West Coast Region (WCR) and the Lower River Region (LRR). These are areas with large volumes of passenger transport and goods transport from all sides (Senegal to the north and south and Guinea-Bissau to the south). The high human traffic adds to its vulnerability, as do cross-border market activities, limited health care services and facilities, poor water, sanitation, and hygiene practices, and traditional burial ceremonies.

Figure 10: *Map of the Gambia (Geographic Guide).*

7.2 Study designs

The data for Study 1 and Study 3 were gained in a cross-sectional survey (Survey 1) that measured the intention to follow two EVD prevention behaviours (calling the Ebola hotline, and not touching a person who might be suffering from EVD), habitual handwashing behaviour, and the corresponding contextual and psychosocial factors. These two studies are described in the Chapters II and IV (see Table 2). Study 2 was also a cross-sectional survey, conducted in the Gambia. Chapter III reports the findings from Study 2. The same measures on intentions to follow two EVD prevention behaviours, and the psychosocial factors were applied as in Survey 1. In Survey 2, respondents were also interviewed about their experience of EVD response promotional activities and additionally, handwashing behaviour has been measured (see Table 2).

Table 2: Overview of the studies and surveys

Part of the thesis	Study	Survey 1	Survey 2
Chapter II	Study 1: Contextual and psychosocial factors of EVD prevention behaviours Guinea-Bissau	x	
Chapter III	Study 2: Evaluation study the Gambia		x
Chapter IV	Study 3: Handwashing habits Guinea-Bissau	x	

7.3 Participant selection

In both surveys, participants were chosen using the random route method according to the protocol defined by Hoffmeyer-Zlotnik (2003). In each village or neighbourhood, the interviewers were sent to randomly selected intersections. The data collectors were instructed to select from there every third household when walking in the direction chosen. The main target group in both surveys were the primary care providers, meaning the person who is responsible for the care of sick family members. In the Gambia, the majority of the interviewees were women (87.3%). In Guinea-Bissau, the gender distribution of the interviews was more balanced, although men were normally not responsible for taking care of the sick. The aim of interviewing men was to detect differences in prevention behaviours and their relevance to EVD transmission and prevention.

7.4 Data collection procedures

In July and August 2015, quantitative data from 1369 respondents in Guinea-Bissau were gathered by a team of 20 male and female local employees in the health sector. Quantitative data were collected from 498 respondents in the Gambia in May and June 2015 by a team of ten male and female local health sector employees. All data were collected through structured face-to-face interviews. In Guinea-Bissau, most of the interviews were carried out in Creole, while a small minority was held in Bijago, both local languages. In the Gambia, interviews were held in Jola, Mandinka, or Fula, all local languages. Each interview lasted around one

hour, and all interviews were conducted using paper-and-pencil format. In the Gambia, a qualitative pre-study was performed prior to the quantitative survey. Four focus group discussions were conducted with total 70 men and 70 women separately for men and women. The goal was to gain an insight into barriers and conditions facilitating EVD prevention behaviours. Before each survey, the data collection teams were thoroughly trained, in Guinea-Bissau for 7 days and and in the Gambia for 5 days. This training included an introduction to interviewing techniques, the study's methodology and goals, and the theoretical background of the study questionnaire. Major elements of the training included a detailed discussion of the questionnaire and the translation of the questions into the local languages; this was to make sure that all data collectors used the same vocabulary to ask the questions and present the answer categories. Furthermore, a lot of practical exercises were conducted, as were role plays to practice interviews. During the entire period of data collection, the data collection teams were accompanied and supervised by the local partners and trained supervisors, who coordinated and ensured the quality of the interviews.

7.5 Questionnaire

All interviews were based on a structured questionnaire developed specifically for the studies of this thesis (see Appendices I and II). The questionnaires contained items to measure the contextual and the psychosocial factors of the RANAS model (Mosler, 2012), handwashing frequency and handwashing habit, and the intention to follow the two EVD prevention instructions (to call the Ebola hotline, and not to touch a person who might be suffering from EVD). The psychosocial items were based on recent work used for other WASH-related behaviours in developing countries (Contzen & Mosler, 2013; Huber & Mosler, 2013; Inauen et al., 2013a). The item wordings were adapted to the local context of the study countries. Survey 2 was conducted before Survey 1 so the questionnaire could be revised before use in Survey 1. The questionnaire for the survey in Guinea-Bissau was prepared in Portuguese, the one for the Gambia in English. The translation of the questions was intensively discussed, both during data collector training and together with professional translators. At the end of the data collectors' training, the applicability of the questionnaires was verified by a pre-test and the results of the pre-test were integrated in the final version of the questionnaire.

7.6 Ethical conduct

Both surveys were conducted in strict compliance with the ethical guidelines of the American Psychological Association (APA), the Declaration of Helsinki, and the ethics review guidelines of the University of Zurich, Switzerland. Study 1 and Study 3 obtained the approval of the Ethical Committee of the Ministry of Public Health Guinea-Bissau. Study 2 received ethical approval from the School of Medicine and its allied Health Sciences Research and Publication Committee at the University of the Gambia. In all studies, the participants provided their written informed consent. Whenever a selected household refused to participate in the study, the household was thanked and the data collector left.

The following Chapters II–IV present the empirical studies that were conducted to answer the research questions described above.

Chapter II

Contextual and psychosocial factors predicting Ebola prevention behaviours using the RANAS approach to behaviour change in Guinea-Bissau

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Abstract

Background. The outbreak of the Ebola virus disease (EVD) in West Africa in December 2013 was the largest EVD outbreak in history. This study aimed to measure the underlying contextual and psychosocial factors of intentions to perform EVD prevention behaviours (not touching people who might be suffering from EVD, reporting suspected cases to the Ebola hotline in Guinea-Bissau. Geographical location, cross-border market activities, poor water, sanitation and hygiene (WASH) conditions, and burial practices in some communities pose a serious risk in terms of potential EVD outbreak and seriously hamper its prevention in Guinea-Bissau.

Methods. In July and August 2015, quantitative data from 1369 respondents were gathered by structured face-to-face interviews. The questionnaire was based on the psychosocial factors of the RANAS (risks, attitudes, norms, abilities, and self-regulation) model. Data were analysed by multiple linear regression analyses.

Results. The most important predictors for the intention to call the Ebola hotline were believing that calling the hotline would help the infected person, perceiving that important members from the household approve of calling the hotline, thinking that calling the hotline is something they should do, and believing that it is important to call the hotline to report a suspected case. For the intention not to touch someone who might be suffering from EVD, the most important predictors were factual knowledge, the perception of risk with regard to touching a person who might be suffering from EVD, and the belief that they were able not to touch a possibly infected person. Age in years was the only significant contextual predictor for one of the two behavioural intentions, the intention to call the hotline. It seems that younger people are more likely to use a service like the Ebola hotline than older people.

Conclusions. Strengths and gaps were identified in the study population in relation to the intention to perform prevention behaviours. These call for innovative ways of aligning existing hygiene programmes with relevant psychosocial factors. This research is relevant to further outbreaks of contagious diseases as it sheds light on important aspects of the impact of public health interventions during emergencies and epidemics.

Keywords: Ebola prevention, EVD, RANAS model, emergencies and outbreaks, behavioural intention, behavioural willingness, regression analysis, psychosocial factors

Introduction

The outbreak of the Ebola virus disease (EVD) in West Africa, which started in Guinea in December 2013, was the largest and most complex EVD outbreak in history. By the end of March 2016, 28,646 cases of EVD were confirmed, probable, or suspected, and 11,323 deaths had been reported (WHO, 2016b). The most severely affected countries were Guinea, Liberia, and Sierra Leone; the virus spread across land borders from Guinea to the other two countries, with Nigeria, Senegal, Mali, Spain, Italy, and the United States of America also reporting cases.

EVD is a severe illness in humans with case fatality rates between 25% and 90% and an average fatality rate of around 50% (WHO, 2016c). Wild animals, such as bats and monkeys, can transmit the virus to people; it then spreads through human-to-human transmission via direct contact with the body fluids (stool, vomit, blood, urine, saliva, semen, breast milk) of infected people and by contact with surfaces or equipment contaminated by the body fluids of an infected person (WHO, 2015).

In July 2015, the Emergency Committee convened by the WHO (World Health Organization) Director-General recommended strengthening Guinea-Bissau's EVD preparedness and its prevention and response capacities (WHO, 2015). Guinea-Bissau was vulnerable to a potential EVD outbreak for several reasons. Indeed, Guinea-Bissau remained at high risk throughout the regional epidemic due to its proximity to Guinea, with some cases confirmed just a few kilometers away from the border with Guinea-Bissau. Cross-border market activities, burial ceremonies and poor water, sanitation, and hygiene conditions in many communities (UNICEF & WHO, 2015) were among the main factors contributing to Guinea-Bissau's high EVD-related vulnerability. To be prepared for the eventuality that EVD would affect the country, the government of Guinea-Bissau opened new field hospitals and arranged a procedure to evacuate suspected cases to health centers.

Since an EVD vaccine is still in the testing phase, and has been mainly used to contain flare ups in 2016 under an emergence use protocol (Skrip & Galvani, 2016), prevention behaviours play a crucial role in avoiding further transmission of the virus. The main transmission route is human-to-human contact, and preventive behaviours can avoid or reduce transmission. Un-

derlying psychosocial factors are key aspects of such behaviours and ought thus to be taken into account.

A person suffering from EVD needs to be treated and isolated in a health center. To enable rapid communication in a suspected case of EVD, the Health Ministry launched the Ebola hotline. One objective of this study was to determine the strength of the intention of the population in Guinea-Bissau to use the Ebola hotline to report a suspected case of EVD.

If a person might be suffering from EVD in the household, another very important behaviour is not to touch this person, due to the high risk of infection via direct contact with their body fluids. Taking care of a sick person is often the responsibility of close family members and puts them at high risk of being infected as well. However, not touching someone who might be suffering from EVD could be seen as disloyal and selfish by others. The second objective of this study was therefore to reveal the psychosocial factors of the intention not to touch someone who might be suffering from EVD. As there were no cases of EVD in Guinea-Bissau, compliance with the two prevention instructions, to report a suspected case via the Ebola hotline and not to touch someone who might be suffering from EVD, could not be measured directly. For this reason, behavioural intention and behavioural willingness were measured.

Richards and colleagues (Richards et al., 2015), analysing the social pathways for EVD in rural Sierra Leone, emphasize the role of the family as an important social factor in EVD transmission. They found that trust was highest for the study participants in household members and extended family, and they expected to find assistance mainly within the family of the EVD case. Nevertheless, trust and respect towards authority is also high, especially for local and traditional leaders (Richards et al., 2015). A few months after the outbreak, local chiefs, religious authorities, and local opinion leaders were included in public health interventions against EVD, since messages from these sources proved to be taken seriously by the population.

Reporting a suspected case, for instance by calling the Ebola hotline, and not touching someone who might be suffering from EVD are prevention behaviours. When seeking to increase the population's prevention behaviours towards EVD, it is to be acknowledged that some people have a high intention to follow instructions, while others do not. The impact of prompt human behavioural response on the infection rate was the research topic of Hu and colleagues (2015).

They used epidemiological modeling to quantitatively investigate the effects of behavioural changes on the transmission of EVD. In particular, the social distancing of infected individuals, which includes not touching a person who might be suffering from EVD, could significantly reduce the transmission of the disease, mainly between infected individuals and their close social environment, such as family members, neighbours, and friends.

The purpose of this study was to identify the contextual and psychosocial factors related to compliance with EVD prevention instructions in a population. The underlying psychosocial factors that determine behaviour can be altered with psychosocial interventions (Michie & Johnston, 2012; Michie et al., 2008). Aboud and Singla (2012) stress the importance of understanding the willingness and ability of a target audience to follow health messages in developing adequate behaviour change interventions. Besides this, they point out the importance of taking into account behaviour change theories and evidence from previous interventions.

Throughout the 18-month period of EVD preparedness in Guinea-Bissau, UNICEF and its partners worked in synergy with the Government of Guinea-Bissau to strengthen the country's health system and other capacity to face a potential EVD outbreak.

In line with the WHO's consolidated preparedness EVD checklist (WHO, 2015), the priorities were to strengthen overall institutional coordination, establish a rapid response team, increase public awareness and community engagement, build infection prevention, control, and case management capacity (both at EVD treatment centres and for safe and dignified burials), establish and strengthen epidemiological surveillance, and systematize contact tracing.

The main priorities and challenges included constantly strengthening detailed coordination amongst partners, between partners and government and within government entities; monitoring actions across the country; and supporting coordination between the health authorities of Guinea-Bissau and Guinea to increase bilateral cooperation in EVD prevention, preparedness, and response (as well as other health issues).

Strengthening community engagement, including through dialogue with traditional and religious leaders, and linking these community structures with the national response mechanism remained amongst the most critical priorities throughout the 18-month period of EVD preparedness in Guinea-Bissau. The study presented here was very closely aligned with this cornerstone of EVD preparedness in Guinea-Bissau.

The study took place in rural, peri-urban and urban regions of Guinea-Bissau. Different promotional activities were implemented, and the Ebola hotline number was communicated to the population through a variety of channels like radio spots, leaflets, EVD training sessions in schools and health centers. However, mobile network coverage is problematic in some areas of Guinea-Bissau.

The RANAS model, an acronym whose letters stand for risks, attitudes, norms, abilities, and self-regulation (Mosler, 2012), was used to identify the psychosocial factors and as a theoretical background of the present study. This model is an established one for designing and evaluating behaviour change strategies in developing countries. Psychological factors proposed by major theories of behaviour change (e.g. the health belief model; the health action process approach; the theory of planned behaviour) are integrated in the RANAS model. The model also provides behaviour change techniques that tackle the factors to be changed. The RANAS model incorporates five blocks of psychological factors that have to be favorable for a new health behaviour to be assimilated: risk factors, attitudinal factors, norm factors, ability factors, and self-regulation factors. Risk factors represent the understanding and awareness of an individual about a health risk and the perceived consequences of a disease (Mosler, 2012). Attitudinal factors include beliefs about the costs and benefits of a certain behaviour. Normative factors are convictions about the behaviour performance of the social environment and what the social environment thinks about a certain behaviour. Ability factors include the perceptions of an individual about their personal ability to execute the behaviour. Finally, self-regulation factors are those that are responsible for the continuation and maintenance of the behaviour. First, the factors that are related to the target behaviour in a given population should be determined. Then, specific interventions can be chosen from the behavioural interventions provided by the RANAS model to tackle these factors.

However, behaviours and behavioural intentions are not determined only by psychosocial factors. Dreibelbis and colleagues (2013) concluded from their systematic review of behavioural models that aspects of the physical and natural environment are often underrepresented in WASH-related behaviour change theories. Several studies have demonstrated the relationship between contextual factors and WASH behaviours (Jenkins & Scott, 2007; Seimetz, Boyayo, et al., 2016; Stocker & Mosler, 2015). The RANAS model considers social, physical and personal contextual factors (Mosler & Contzen, 2016b). Demographic factors like age, sex and education belong to the personal context, whereas wealth belongs to the social con-

text. We do not differ between these categories when we talk about contextual factors in the following.

Two research questions are addressed in this paper: Which contextual factors predict the intention to follow EVD prevention instructions? Which are the crucial psychosocial factors for the intention to follow EVD prevention instructions? The outcomes of this study can help to design efficient behaviour change interventions and to address the behavioural barriers in this population.

Methods

Procedure

The cross-sectional data collection took place in July and August 2015 and was accomplished in a paper and pencil format. The study area consisted of all nine regions in Guinea-Bissau: Tombali, Quinara, Oio, Biombo, Bijagos, Bafatá, Gabú, Cacheu, and Bissau. Villages were randomly selected in all regions. The sample sizes in the different regions were determined relative to the population sizes of the regions.

A team of 20 national and local health sector employees carried out structured face-to-face interviews in randomly selected households using the random-route method (Hoffmeyer-Zlotnik, 2003). The interviewers were sent to randomly selected intersections; from there, they selected the households according to the protocol defined by Hoffmeyer-Zlotnik (Hoffmeyer-Zlotnik, 2003).

Each interview took around one hour. Only one person per household was interviewed. Most of the interviews were carried out in Creole, while a small minority were in Bijago, both local languages. Five supervisors coordinated and monitored the interviews and accompanied the data collectors in the field during the data collection. Prior to the data collection, the interviewers attended a seven-day intensive training programme, during which they learned about the study's methodology, its goals, and the theoretical background of the study questionnaire. The data collectors learned how to fill the questionnaire and practised the translation of the questions into the local languages. The village chiefs were informed about the study to be conducted. The study also obtained the approval of the Ethical Committee of the Ministry of Public Health Guinea-Bissau. All study participants provided their written informed consent. One hundred and thirty (9.5%) households did not want be interviewed.

Sample

The sample includes data from 1369 respondents. Most of the study participants (n = 744) were women, who in Guinea-Bissau are the primary care providers for their families, meaning that they are responsible for the care of sick family members. Men (n = 625) were interviewed as well, although they are normally not responsible for taking care of the sick. The aim of

interviewing men was to detect differences in prevention behaviours and because they are also relevant to EVD transmission and prevention. As data collection took place in the rainy season, the villages selected had to be accessible. The data collectors reported that in some regions where not many or no EVD messages were communicated, people did not feel comfortable talking about it. The mean age of the respondents ranged between 15 and 87 years (M = 38.19, SD = 13.79). While 34% of the sample had never attended school, 17.6% had completed primary school, 14.4% secondary school, and 26.6% high school.

A majority, 50.6%, of the participants were Muslim, 30.2% were Christians and 9.4% had traditional beliefs. The rest had another religion or no religion.

Agriculture (47.8%) was the main type of livelihood, followed by daily labor (13.5%), formal work (12.6%, formal working refers to ordinary employment arrangements), and commerce (11.2%). On average, 10 people lived in a household (SD = 7.22), and the mean number of children under the age of five in the study households was 1 (SD = 1.75).

The population of Guinea-Bissau is heterogeneous in ethnicity and religion, both between and within different regions.

Questionnaire and measures

The questionnaire included the psychosocial factors from the RANAS model (Mosler, 2012), the intention and willingness to follow the prevention instructions (to call the Ebola hotline, and not to touch a person who might be suffering from EVD), socio-demographic characteristics and measures of the socio-economic status. Each psychosocial factor was covered by one or more items and scales were built whenever a factor was measured by more than one item. The applicability of the questionnaire was verified by a pre-test at the end of the interviewers' training.

Intention to follow prevention instructions

Because it was not possible to measure the behaviour directly, behavioural intention and behavioural willingness were used as outcome variables. Behavioural intention shows the motivation of a person and how hard a person is willing to try to perform the behaviour (Ajzen, 1991). Behavioural willingness is defined as what an individual is willing to do under certain circumstances (F. X. Gibbons & Gerrard, 1997). Intention and behavioural willingness are

highly correlated; nevertheless, behavioural willingness explains additional variance in the behaviour (F. X. Gibbons, Gerrard, Lane, Suls, & Wallston, 2003). Behavioural intention for the two prevention behaviours was operationalized by a direct question on a self-reported 5-point Likert scale from 1 (not at all) to 5 (very strongly) (see Table 3). To measure the behavioural willingness, the respondents had to imagine themselves in a given situation and to state the degree of their willingness to perform the two prevention behaviours on 5-point Likert scales from 1 (not at all willing) to 5 (very willing). The means of these items were combined for the analysis.

Table 3:
Questions to measure the intention and behavioural willingness of the two prevention behaviours

Scale/construct	**Example item**	***Scale (min/max)***
Intention to call the Ebola hotline	How strongly do you intend to call the Ebola hotline if you had a person with suspected EVD in your household?	1-5
	Now we would like to ask you to imagine yourself in a certain situation. Suppose you were the whole day at the market, to sell vegetables. At the end of the day, you go home and you find a member of your family who is vomiting and the vomit contains blood, which could be a symptom for EVD. In those circumstances, how willing would you be to do the following? ■ To call the Ebola hotline and report the suspected EVD case in your household.	1-5
Intention not to touch someone who might be suffering from EVD	How strongly do you intend to avoid to touch somebody who could be suffering from EVD in your household?	1-5
	"Now we would like to ask you to imagine yourself in a certain situation. Suppose you were the whole day at the market, to sell vegetables. At the end of the day, you go home and you find a member of your family who is vomiting and the vomit contains blood, which could be a symptom for EVD. In those circumstances, how willing would you be to the following? ■ NOT to touch the sick person, thus reducing the risk of contracting EVD.	1-5

Notes. 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly).

Contextual factors

Six contextual factors were included in the analysis (see Table 4). To measure wealth, an index was compiled of self-reported ownership of different goods: whether the respondent owned a computer, fridge, radio, or television, had electricity in their house, owned a clock, bicycle, car, carriage, mobile phone, motorbike or scooter, and/or boat with motor. The coded responses were summed and divided by 12, which is the maximum obtainable score. The final scale ranges from 0 (no wealth) to 1 (high level of wealth). Literacy was operationalized on a 3-point Likert scale from 1 (can neither read nor write) to 3 (can read and write). For the intention to call the Ebola hotline, we asked whether respondents had a mobile phone in the household.

Table 4:
Contextual factors and characteristics of the study participants

Variables	**Scale**	***n***	***M***	***SD***
Age in years		1313	38.19	13.79
Household size		1365	10.91	7.22
Wealth	0-1	1362	.33	.20
		n	**%**	
Gender (% men)	0	626	45.7	
Gender (% women)	1	743	54.3	
Owning a mobile phone		1370	76.8	
Literacy (% can neither read nor write)		493	36.5	
Literacy (% can read only)		19	1.4	
Literacy (% can read and write)		839	62.1	

Notes. M = mean, SD = standard deviation.

Psychosocial factors

To measure the psychosocial factors, one or more items were used, and their means formed the factors used in the statistical analysis. Most of the answers were given on a 5-point Likert scale, and all items were unipolar (see Tables 5 and 6).

Health knowledge was measured with multiple-choice questions (Krebs, 2010). For each question, the respondent had to decide whether it was correct or not; for each correct answer, the respondent received one point, and these were finally summed. For the intention to call the Ebola hotline, action knowledge was operationalized with an open question with responses coded as zero (does not know the number of the Ebola hotline) or one (knows the number). For the intention not to touch someone who might be suffering from EVD, an open question was asked to reveal how the opinion of others could be associated with this intention. The answers were coded into four answer categories as 1 ("they would think I am a not a nice person"), 2 ("they would think I am crazy"), 3 ("they would think I don't want to help this person") and 4 ("they would think I am selfish"). The four categories were integrated in the analyses as binary variables.

Table 5:
Questions to measure the psychosocial factors for the intention to call the Ebola hotline

Scale/construct		**Example item**	***Scale (min/max)***
Risk factors	Vulnerability	How high do you feel is the risk that you get EVD?	1-5
	Severity	Imagine that you contracted EVD, how severe would be the impact on… … your life in general?	1-5
	Health knowledge	Can people transfer EVD to others immediately after being infected?	Multiple choice answers: 0 = answer was wrong, 1 = answer was right

Scale/construct		Example item	*Scale (min/max)*
Attitude factor	Response belief	How certain are you that calling the Ebola hotline will help you or a person who might be suffering from EVD?	1-5
Norm factors	Others' behaviour household	How many people of your household would call the Ebola hotline if there were a person who might be suffering from EVD in your household?	1-5
	Others' behaviour village	How many people of your village would call the Ebola hotline if there were a person who might be suffering from EVD in the same household?	1-5
	Others' (dis)approval household	People, who are important to you, like your family members, how much do they approve or not that you would call the Ebola hotline if there were a person who might be suffering from EVD in your household?	1-5
	Others' (dis)approval village	People who are important in the village like an Imam or a Marabout, do they approve if you would call the Ebola hotline and report the suspected EVD case or not?	1-5
	Personal importance	How strongly do you feel a personal obligation to yourself to call the Ebola hotline if there were a person who might be suffering from EVD in your household?	1-5
Ability factors	Action knowledge	Can you tell me the number of the Ebola hotline?	0-1
	Confidence in performance	How difficult would it be to call the Ebola hotline and report the suspected EVD case in your household?	1-5
Self-regulati	Commitment	How important is it for you to call the Ebola hotline and report the suspected EVD case in your household?	1-5

Notes. 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly).

Table 6:
Questions to measure the psychosocial factors for the intention not to touch someone who might be suffering from EVD

Scale/construct		Example item	*Scale (min/max)*
Risk factors	Vulnerability	How high do you feel is the risk that you get EVD?	1-5
	Severity	Imagine that you contracted EVD, how severe would be the impact on… … your life in general?	1-5
	Health knowledge	Can people transfer EVD to others immediately after being infected?	Multiple choice answers: 0 = answer was wrong, 1 = answer was right
	Risk touching	How high do you think is the risk that you contract EVD, if you touch a person who is suffering from EVD?	1-5
Attitude factor	Response belief	How certain are you that not touching a sick person prevents you from contracting EVD?	1-5
Self-regulation	Control not to touch	How much control do you have over whether you don't touch a person who might be suffering from EVD while taking care of this person at home?	1-5
Additional	Opinion of others	What would others think if you don't touch a person who might be suffering from EVD?	Open question

Notes. 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly).

Data analyses

To answer the research questions, forced-entry multiple linear regression analyses were computed. First, a regression analysis was computed to identify the relevant contextual factors. Second, another regression analysis with the relevant contextual factors and the psychosocial factors was computed. For all regression models, assumptions of no multicollinearity, linearity, independent and normally distributed errors and homoscedasticity were met. For all the other results, either frequencies or descriptive analyses were calculated. All analyses were executed with SPSS 22.

Results

On average, the study participants stated that they had the intention to call the Ebola hotline if a person might be suffering from EVD in the household (see Table 7). Regarding the intention not to touch a person who might be suffering from EVD, the results showed that the respondents were quite willing not to touch someone who might be suffering from EVD (see Table 7).

Table 7:
Means (*M*) and standard deviations (*SD*) of the intention to call the Ebola hotline and the intention not to touch a person who might be suffering from EVD

Dependent variables	***N***	***M***	***SD***
Calling the hotline	1018	3.96	.77
Not touching	1092	3.69	1.04

For means and standard deviations of the psychosocial factors, see Tables 10 and 11.

Except for perceived vulnerability and others' (dis)approval at the village level, the means of the psychosocial factors for the intention to report a suspected EVD case in the household to the Ebola hotline were rather high. The mean value of perceived vulnerability indicates that the respondents estimated their risk of contracting EVD as low to medium. Severity of EVD was perceived as high, and the health knowledge was medium to high. The attitude factor, showed that most respondents were certain that calling the Ebola hotline would help someone who might be suffering from EVD. On average, the study participants perceived calling the Ebola hotline as something that most people in their household would do too, but only half of the people in their village. Furthermore, respondents thought that important members from the household would approve to a medium extent if they were to call the Ebola hotline and that important people from the village would approve slightly less than to a medium extent. On average, the respondents felt personally obliged to call the Ebola hotline and to report a suspected EVD case in the household. However, the results showed that 91.3% of the respondents could not name the number of the Ebola hotline. Means regarding the confidence in per-

formance indicate that the respondents felt confident that they could call the Ebola hotline and did not think it to be a difficult behaviour. On average, the study participants felt committed and thought it is important to report a suspected EVD case to the Ebola hotline.

With regard to the psychosocial factors of the intention not to touch someone who might be suffering from EVD, the respondents stated that they were certain that not touching a sick person would help them avoid contracting EVD. The study participants felt that it is under their control whether or not they touch a person who might be suffering from EVD while taking care of this person at home.

Contextual predictors of the intention to follow Ebola prevention instructions

The linear regression analysis of the intention to call the Ebola hotline with contextual factors (see Table 8) identified age in years (β = -.168), wealth (β = .118), and having a mobile phone (β = .125) as significant predictors. Only 7.1% of the variance could be explained by the model (see Table 8). Younger people and respondents with a higher level of wealth have a higher intention to call the Ebola hotline than others. Participants who had a mobile phone reported a greater intention to call the Ebola hotline than those who did not have a mobile phone (see Table 8).

The linear regression analysis of the intention not to touch someone who might be suffering from EVD with contextual factors (see Table 9) found literacy (β = .073) and wealth (β = .084) to be significant predictors. Again, the explanation of the variance was very low at 1.4% (see Table 9). Participants with higher literacy and a higher level of wealth have a higher intention than others not to touch someone who might be suffering from EVD (see Table 9).

Table 8:
Regression analysis of the intention to call the Ebola hotline with contextual predictors

Variables	***β***
Gender	-.024
Age in years	-.168***
Household size	-.050
Literacy	.030
Wealth	.118***
Having a mobile phone	.125***

Notes. *p ≤ .05, **p ≤ .01, ***p ≤ .001. Adj. R^2=.071. *N*=1293.

Table 9:
Regression analysis of the intention not to touch someone who might be suffering from EVD with contextual predictors

Variables	***β***
Gender	.013
Age in years	-.042
Household size	-.007
Literacy	.073*
Wealth	.084**

Notes. *p ≤ .05, **p ≤ .01, ***p ≤ .001. Adj. R^2=.014. *N*=1294.

Data from men were collected in order to detect gender differences in the two behavioural intentions. The results from the two regression analyses with the contextual factors show that gender was not a significant predictor for the two behavioural intentions.

Psychosocial predictors of the intention to follow Ebola prevention instructions

The significant contextual predictors were included in the regression analysis with the psychosocial factors from the RANAS model (see Tables 10 and 11). Eight psychosocial factors and one contextual factor contributed significantly in predicting the intention to call the Ebola hotline (see Table 10). The age in years (β = -.090), perceived severity (β = .108), health knowledge (β = .095), and response belief (β = .137) predicted the intention to report a suspected EVD case to the Ebola hotline. Three of the norm factors were positively and significantly related to a higher intention to report a suspected EVD case to the Ebola hotline: Others' behaviour household (β = .075), meaning that the respondents perceived that many others from their household would call the Ebola hotline as well; others' (dis)approval in the household (β = .126), meaning that important members from the household approve of calling the Ebola hotline; and personal importance (β = .204), meaning that the respondents believe that calling the Ebola hotline is something they should do. Furthermore, confidence in performance (β = .073) and commitment (β = .162) correlated with a higher intention to call the Ebola hotline. Together, the factors explained 46.2% of the variance of the intention to call the Ebola hotline.

Table 10:
Regression analysis of RANAS behavioural determinants explaining the intention to call the Ebola hotline and reporting a suspected EVD case

Factor group	Behavioural determinants	*M (SD)*	*β*
Context	Age in years	37.50 (13.90)	-.090***
	Wealth	.31 (.20)	.014
	Having a mobile phone		.035
Risk factors	Vulnerability	2.47 (1.34)	.017
	Severity	4.46 (.68)	.108***
	Health knowledge	19.11 (4.88)	.095***
Attitude factors	Response belief	4.11 (0.81)	.137***
Norm factors	Others' behaviour household	3.81 (1.13)	.075*
	Others' behaviour village	3.17 (1.14)	-.024
	Others' (dis)approval household	3.26 (.82)	.126***
	Others' (dis)approval village	2.84 (1.12)	-.027
	Personal importance	4.06 (.73)	.204***
Ability factors	Action knowledge (Hotline number)	*n. a.*	.020
	Confidence in performance	3.98 (1.01)	.073**
Self-regulation factors	Commitment	4.15 (.69)	.162***

Notes. *p ≤ .05, **p ≤ .01, ***p ≤ .001. Adjusted R^2=.462. *N*=979.

Seven psychosocial factors significantly predicted the intention not to touch someone who might be suffering from EVD (see Table 11). Again, perceived severity (β = .124) and health knowledge (β = .132) were psychosocial determinants of the intention not to touch someone who might be suffering from EVD. Risk touching, meaning people think that there is a risk of contracting EVD by touching a person who might be suffering from it (β = .210) and response belief (β = .121), meaning people are certain that not touching a sick person prevents them

from contracting EVD, were significant predictors of the intention not to touch someone who might be suffering from EVD. The factors control not to touch (β = .132) and two of the opinions of others were found to be significant predictors of the intention not to touch someone who might be suffering from EVD: people who think that others would see them as not a nice person (β = -.216) and as a person who does not want to help (β = -.067) have a lower intention not to touch than others. The model could explain 27.5% of the variance in the intention not to touch someone who might be suffering from Ebola.

Table 11:
Regression analysis of RANAS behavioural determinants explaining the intention not to touch someone who might be suffering from EVD

Factor group	Contextual or psychosocial predictors	M (SD)	β
Context	Literacy		.011
	Wealth	.32 (.19)	.037
Risk factors	Vulnerability	2.38 (1.35)	-.050
	Severity	4.51 (0.65)	.124***
	Health knowledge	19.55 (4.65)	.132***
	Risk touching	4.08 (0.91)	.210***
Attitude factors	Response belief	4.20 (0.78)	.121**
Self-regulation factors	Control not to touch	4.07 (0.79)	.132***
Additional factors	1 Not a nice person		-.216***
	2 A crazy person		-.010
	3 Not a helping person		-.067*
	4 A selfish person		-.040

Notes. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$. Adjusted R^2=.275. N=1075.

Discussion

This study aimed to determine contextual and psychosocial factors in Guinea-Bissau which predict the intention to call the Ebola hotline and the intention not to touch someone who might be suffering from EVD. There are other studies, which investigated EVD risk perceptions, EVD knowledge and the prevention of the EVD during the last EVD outbreak in West Africa (Gesser-Edelsburg, Shir-Raz, Hayek, & Lev, 2015; Kelly et al., 2015; Petrie et al., 2016; Rolison & Hanoch, 2015; Rübsamen et al., 2015). However, the populations of these studies were objectively at lower risk of contracting EVD than the population assessed in this study.

The study participants stated that they were willing to call the Ebola hotline if they suspected a case in the household and that they were quite willing not to touch someone if that person might be suffering from EVD. A study about EVD risk perceptions in Germany (Rübsamen et al., 2015) also found that most of their study participants would change their behaviour in order to prevent an outbreak of the EVD. The majority of the respondents in this study has access to a mobile phone in their household. In general, the contextual factors did not explain much of the variance in the intention to follow the two prevention instructions. Wealth was the only contextual factor, which significantly predicted both intentions, although only in the regression model with the contextual factors alone. The effect of wealth was mediated through one or more of the psychosocial factors, indicating that respondents' risk perceptions, attitudes, beliefs, abilities and self-regulation fully explained the effect of household wealth on the two behavioural intentions. The age in years was a significant predictor for the intention to call the Ebola hotline, and it remained significant in the regression model with the psychosocial factors. It seems that younger people are more likely to use a service like the Ebola hotline than older people and that the psychosocial factors did not wholly explain the effect of age on the intention to call the Ebola hotline. A recent study from New Zealand about public perceptions and knowledge of the EVD found that age, sex and education were significant predictors for the variance in the number of named protective behaviours (Petrie et al., 2016). A younger age was significantly associated with a larger number of protective behaviours and a higher willingness to vaccinate. Having access to a mobile phone was only relevant in the regression model of the contextual factors predicting the intention to call the Ebola hotline, but not in combination with the psychosocial factors. The same was the case for literacy and

the prediction of the intention not to touch someone who might be suffering from EVD; this was no longer relevant when combined with the psychosocial factors.

In general, the RANAS model was able to explain the intention to follow the two EVD prevention behaviours well. Nevertheless, there is one caveat: Even though we included a large number of covariates in the models and we were testing multiple hypotheses, we did not include any corrections for multiple comparisons in the analysis.

Factors from all five factor blocks of the RANAS model, namely risks, attitudes, norms, abilities, and self-regulation, were found to be underlying psychosocial factors for the intention to call the Ebola hotline. We revealed that the most important predictors of this intention were the following four: believing that calling the Ebola hotline will help the infected person (Response belief), perceiving that important members from the household approve of calling the Ebola hotline (Others' (dis)approval household), that the respondents think calling the Ebola hotline is something they should do (Personal importance) and the belief that it is important to call the Ebola hotline and to report a suspected case (Commitment).

Attitude factors like response belief or outcome expectations are important determinants for behaviours in various theories in the field of social and health psychology, such as the social cognitive theory (Bandura, 1986), the health belief model (Rosenstock, 1974) and the health action process approach (Schwarzer, 2008). The importance of being confident about the ability of their government to control infectious diseases was as well found in the study from Kelly and colleagues (2015) about perceptions and plans for the prevention of EVD in US during the outbreak in West Africa. Normative beliefs, such as the perception of what others are doing, the perceived approval of important others in the social environment, and the belief of what should personally be done, have been important predictors in several handwashing studies (Contzen & Mosler, 2015; Curtis et al., 2009; Devine et al., 2012). Others' (dis)approval has also been found to explain the increase in the consumption of deep-tube-well arsenic-free water in Bangladesh (Mosler, Blöchliger, & Inauen, 2010). In our study, the perception of what others in the household might do and whether others in the household approve of calling the Ebola hotline were underlying psychosocial factors, but the normative beliefs of what people in the village would do (Others' behaviour village) or whether they approve of calling the Ebola hotline (Others' (dis)approval household), were not significant predictors. This might be because calling the Ebola hotline is a behaviour that is not shown to people outside the household. However, as Richards and colleagues (2015) found, trust to-

wards local and traditional leaders is high. Personal importance has also been found to be a predictor of habitual cleaning of household drinking water storage containers with soap and water (Stocker & Mosler, 2015) and of cleaning intentions for shared toilets in slums in Kampala (Tumwebaze, Niwagaba, Günther, & Mosler, 2014).

Commitment strength has been found to be an important predictor for various WASH behaviours in developing countries: for choosing safe water options in Bangladesh (Inauen et al., 2013a), for habitual latrine cleaning in rural Burundi (Sonego & Mosler, 2014), and for handwashing in Ethiopia and Haiti (Contzen & Mosler, 2015). Factors from the risk, attitude and self-regulation blocks of the RANAS model were found to be associated with the intention not to touch someone who might be suffering from EVD. This behavioural intention was more difficult to measure, as it should not be performed; it is thus also more difficult to avoid its unintentional promotion during the study interviews. In order to avoid talking about this behaviour for a long time, we asked only a few questions about it. For this reason, not all the factor blocks of the RANAS model could be covered.

For this intention, the most important predictors were health knowledge, risk perception with regard to touching a person who might be suffering from EVD and the belief in being able not to touch a possibly infected person (Control not to touch, Confidence in performance). The finding that a higher knowledge is significantly associated with a higher intention to perform EVD prevention behaviours is consistent with a study from US (Rolison & Hanoch, 2015), which showed that more knowledgeable respondents were more likely to believe that preventive actions will help against contracting EVD.

Confidence in performance, which predicted both intentions to follow EVD prevention behaviours, has also been found to be a predictor of handwashing behaviour in Haiti (Contzen & Mosler, 2013) and the use of arsenic-safe water options in Bangladesh (Inauen et al., 2013a). Self-efficacy is a key factor of behaviour and affects all other psychosocial factors, according to Bandura (Bandura, 1986).

Additional, but weaker, predictors were the perceived severity of EVD (for both intentions) and health knowledge (for the intention to call the Ebola hotline). Health knowledge is seen as a precondition for change in Bandura's Social Cognitive Theory (1986). However, risk perceptions and health knowledge are only seen as secondary in major behaviour change theories (Conner & Norman, 2005). Perceived severity only motivated handwashing in the case of epidemics such as cholera (Curtis et al., 2009). This finding is in line with the present study,

in which perceived severity is a motivator for the behavioural intentions to follow two prevention behaviours during an EVD outbreak in the region.

Implications for practice

The underlying psychosocial factors reveal that the intention to call the Ebola hotline can be increased by possible pathways to improving outcomes, for instance by a normative behaviour change technique like providing a positive group identity (Mosler & Contzen, 2016a). People who are already committed to calling the Ebola hotline will be described in an attractive way, for instance as modern, in order to increase the attractiveness of the behaviour itself. A possibility to increase the commitment are public pledges made by a number of people in public places (streets, markets, etc.) and, for instance, communicated in a radio advert. They can be interviewed and all of them can also remind the listener what the number of the Ebola hotline is. They say that they would call the Ebola hotline if there were a suspected EVD case in their household and that they know calling the Ebola hotline will help the affected person. This could increase the commitment of others to calling the hotline and strengthens using this service as a social norm.

A future prevention campaign to increase the intention not to touch someone who might be suffering from EVD should focus on people's knowledge about EVD, their risk perception about touching a person who might be suffering from EVD, and their confidence in being able not to touch someone who might be suffering from EVD. Mosler & Contzen (Mosler & Contzen, 2016a) propose enhancing people's health knowledge by presenting facts and scenarios about the possibilities of contracting a certain disease and about the relationship between a certain behaviour and the disease by showing how situations in the everyday life of the participant can lead to the disease. The perception of risk in touching someone who might be suffering from EVD could be tackled by informing people about personal risk and by assessing it in such a way that people understand that their health is at risk, and that even other people in the family may be put at risk by an individual's behaviour. A range of behaviour change techniques could be used to boost people's confidence and enable them not to touch someone who might be suffering from EVD, for instance, by encouraging participants to seek practical or emotional support from relatives, friends, or others and by demonstrating how to react if someone may be suffering from EVD. Another way to enhance confidence could be through demonstrating and modelling the behaviour and its consequences in everyday life, for

example through a theatre play, showing that not touching a person who might be infected will protect the rest of the family from EVD. Reasons for still touching someone even if he or she show symptoms of EVD include the fear that others would think the respondent a bad person if he or she did not touch a suspected EVD case and that others would think the respondent does not want to help a sick person. This is a critical barrier for a proper prevention behaviour in an outbreak of EVD or other highly contagious diseases and would need to be taken into account when designing an EVD preparedness campaign.

Conclusions

In order to determine the most important factors that are related to the intention to follow EVD prevention behaviours, we considered both contextual and psychosocial factors. For behaviours such as reporting a suspected EVD case to the Ebola hotline, campaign designers need to know about the availability of telephonic coverage in the country, and campaigns should also be adapted to illiterate people.

Although the perceived severity of the disease and health knowledge were predictors for the intention to follow the EVD prevention behaviours, some other predictors, such as response belief, normative beliefs, commitment, and confidence in performance, were even more important in predicting behavioural intention. Many promotion activities focus primarily on disseminating knowledge about the risks and benefits of hygiene practices. If raising knowledge about the dangers of a disease has a relatively small effect on people's behaviour and behavioural intentions, aid providers may need to adapt their messages to include other drivers of behaviours and intentions in their interventions.

The most recent EVD outbreak is over, but this research can be used for further outbreaks of contagious diseases, including recurrent endemic cholera bouts or the emerging Zika threat in Guinea-Bissau and elsewhere, as the results of the study presented in this paper shed light on important aspects of the impact of public health activities, especially during emergencies. A study about EVD knowledge in Israel concluded that the greatest challenges that organizations face is to provide comprehensive information that empowers the target population to make fact-based decisions about health and reflects uncertainty (Gesser-Edelsburg et al., 2015). Ultimately, the regional EVD outbreak ought to be used as an opportunity to channel the efforts deployed in EVD preparedness in Guinea-Bissau towards the strengthening of its public health system.

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Chapter III

The impact of various promotional activities on Ebola prevention behaviours and psychosocial factors predicting Ebola prevention behaviours in the Gambia

Evaluation of Ebola prevention promotions

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Abstract

Background. The last outbreak of Ebola virus disease is over, and the promising effects of an EVD vaccine have been confirmed. However, outbreaks of contagious diseases will recur. This paper aims to evaluate the effectiveness of EVD prevention promotions in the Gambia and to assess the psychosocial factors that steer three EVD-preventive behaviours in the Gambia: handwashing with soap, calling the Ebola hotline, and not touching a person who might be suffering from EVD.

Methods. Structured face-to-face interviews were used to collect cross-sectional data in different regions in the Gambia, where a local NGO had previously conducted EVD prevention promotions. Data were gathered from 498 primary care providers. The questionnaire was based on psychosocial factors from the risks, attitudes, norms, abilities, and self-regulation (RANAS) model. Data was analysed by multiple linear regression and mediation analyses. *Results.* Three promotional activities were significantly associated with some or all of the key psychosocial factors of handwashing and thus with increased handwashing behaviour: home visit, poster, and info sheet. A hygiene kit that was distributed was not associated with any of the key psychosocial factors or with handwashing. None of the evaluated promotional activities was significantly associated with increased intention to call the Ebola hotline. Norm factors, especially the perception of what other people do, had a great impact on handwashing with soap and on calling the Ebola hotline. The perceived certainty that a behaviour will prevent a disease was a predictor for all three protection behaviours. Commitment to the behaviour emerged as especially relevant for the intention to call the Ebola hotline and for not touching a person who might be suffering from EVD. *Conclusions.* Health behaviour change programmes should rely on evidence to target the right psychosocial factors and to maximize their effects on prevention behaviours, especially in emergency contexts.

Keywords: Ebola virus disease (EVD) prevention, behaviour change, psychosocial factors, RANAS model, handwashing with soap, emergencies and outbreaks, mediation analysis

Introduction

During the last outbreak of the Ebola virus disease (EVD) in West Africa, 28,646 cases were confirmed, probable, or suspected, and 11,323 deaths were reported (WHO, 2016b). EVD is a severe illness with a mortality rate between 25% and 90% and an average fatality rate of around 50%. Fruit bats (family Pteropodidae) are considered a reservoir of EVD; they spread the virus to chimpanzees, gorillas, monkeys, and humans. Human-to-human transmission occurs via blood, body fluids, contaminated objects, handling of dead bodies during funerals, and sexual transmission after recovery (WHO, 2016c). Although promising effects of an EVD vaccine have recently been confirmed in Guinea (Henao-Restrepo et al., 2015), outbreaks of contagious diseases, such as the emerging Zika virus disease or endemic cholera, will recur. Besides vaccines against contagious diseases, preventive behaviours play a crucial role in impeding further transmission in a population. The WHO recommends to apply the following package of interventions to control an outbreak: surveillance, infection prevention and control practices, case management, contact tracing, community engagement and social mobilization, safe burials, and a good laboratory service (WHO, 2016c). The spread of EVD was facilitated by weak governments and their limited capacities to monitor fluid borders (Bausch & Schwarz, 2014). Besides coordinating control and communication between affected countries and their vulnerable neighbour countries and medical treatment options for combatting EVD (Akhtar et al., 2014), research is needed to ensure the impact of public health strategies.

Accurate evaluations of health interventions implemented in emergency settings are rare (Aboud & Singla, 2012; Vujcic et al., 2015). Increasing the efficiency of public health interventions requires rigorous evidence about the effectiveness of interventions to change behaviour and their impact on health outcomes (Davidson et al., 2003; Michie & Abraham, 2004).

In the last outbreak of EVD in West Africa, a disease previously unknown in the affected population, health workers had to address disbeliefs about the disease and strong cultural traditions that contributed to the spread of the virus (e.g. caring for sick persons at home, going to traditional healers, being in close contact with dead bodies before the burial ceremony). Communication is a key activity during an emergency response (Rhoads et al., 2016), but the content of the messages should go beyond simple health information. Awareness-raising and information, both of which were crucial and essential in the affected regions, do not on their own necessarily lead to the desired behaviour. However, they can build the foundation of a

behaviour change in the longer term (Biran et al., 2009; Hoque, Juncker, Sack, Ali, & Aziz, 1996). Behaviours are based on processes in the minds of individuals, so the uptake of new protective behaviours requires either that people's mindsets are in favour of these behaviours, or that they change (Mosler & Contzen, 2016b). Effective interventions set the mindset in favor of the desired outcome behaviour. Therefore, understanding what drives a specific behaviour within a specific population or context are essential to developing effective public health interventions, and not only in an epidemic or pandemic (Abraham, Abraham, & Kools, 2012; Mosler, 2012). Systematic behaviour change, as proposed by Mosler (2012), is based on research from environmental and health psychology. It first systematically assesses the psychosocial factors that steer behaviour. Knowledge of the psychosocial factors underlying the desired behaviours can then guide the selection of evidence-based interventions. The final phase of systematic behaviour change evaluates the effectiveness of the interventions and the mechanisms of the change (Contzen & Mosler, 2015). The urgent need for careful evaluation of emergency hygiene promotions has been shown by Contzen and Mosler (2013). They evaluated the impact of various promotional activities on handwashing behaviour as a response to a cholera outbreak in Haiti after the earthquake in 2010. The evaluation revealed that several promotional activities had negative associations with behaviour, meaning people who had experienced the activity reported less handwashing. This finding indicates that the activity might be not only ineffective but even counterproductive Therefore, accurate evaluations of promotional activities are crucial to maximize their impact and to avoid unwanted effects.

In the month before this study in the Gambia took place, the local collaborator, Concern Universal, together with other local partners, implemented the following EVD prevention promotions: Household visits, posters with information about EVD at public places, EVD information sheets for the households, and hygiene kits. This study aimed to evaluate these EVD prevention promotions in the Gambia. The main objective was to reveal whether the promotions successfully tackled key psychosocial determinants of the prevention behaviours, because this is a precondition for the effectiveness of health promotions and enables understanding of why a promotional activity was effective. Furthermore, it will be possible to show which of the key determinants have not been tackled so far by promotional activities. Another objective was to identify the key determinants of the three EVD preventive behaviours of interest: handwashing with soap, calling the Ebola hotline, and not touching a person who might be suffering from EVD. The findings of this study can be used to improve the EVD response activities that have already been implemented by including the key psychosocial determinants

that have not been addressed so far and that are therefore promising targets for increasing EVD prevention behaviours.

The risks, attitudes, norms, abilities, and self-regulation (RANAS) approach, which was developed to predict health behaviour in developing countries (Mosler, 2012), offers an effective instrument for identifying psychosocial factors in the water, sanitation, and hygiene (WASH) and health sector and has been applied to answer the research questions of the present study. The RANAS approach enables also to evaluate the effectiveness of promotional activities by looking at their underlying mechanisms. This reveals why interventions were successful or not, because it can be showed that they successfully tackled the key behavioural factors, or not. The applicability of the approach has been demonstrated in various studies (Contzen et al., 2015; Contzen & Mosler, 2013; Seimetz, Boyayo, et al., 2016; Sonego & Mosler, 2014).

The RANAS model includes five blocks of factors. Risk factors include factual knowledge about the transmission of a disease, methods of prevention, personal consequences, perceived vulnerability, and the perceived severity of contracting a disease. Attitude factors include beliefs about the costs and benefits of a particular behaviour and feelings associated with the behaviour. Norm factors, such as the perception of what others are doing, others' (dis)approval, and personal importance, relate to perceived social influence. Ability factors include people's confidence in the performance of a particular behaviour. Self-regulation factors include the management of conflicting goals, distracting cues and barriers, commitment, and remembering the behaviour.

The preventive behaviours during an EVD outbreak include regular handwashing with soap, reporting suspected EVD cases to the Ebola hotline or a health facility, and not touching a sick person (WHO, 2016c). Because there were no cases of EVD in the Gambia, the behaviours of calling the EH to report a suspected case and not touching someone who might be suffering from EVD could not be measured directly. Therefore, behavioural intention and behavioural willingness were examined for these behaviours.

This paper presents cross-sectional study results from an EVD response survey in the Gambia and addresses four research questions:

- Which are the crucial psychosocial determinants of handwashing with soap at critical junctures under the threat of EVD?

- Which are the crucial psychosocial determinants of the intention to call the Ebola hotline to report a suspected case of EVD?
- Which are the crucial psychosocial determinants of the intention not to touch someone who might be suffering from EVD?
- Which promotional activities are associated with which psychosocial factors and are through these factors associated with the preventive behaviours?

Methods

Research area

The Republic of the Gambia is one of Africa's smallest countries. It is surrounded by Senegal except for its coastline on the Atlantic Ocean at its western end. The Gambia is divided into five administrative regions and one city. The study area consisted of two regions in which EVD promotion activities were conducted: the West Coast Region (WCR), comprising 19 communities, and the Lower River Region (LRR), comprising 22 communities. Data were collected in all these communities. These are areas with large volumes of passenger transport and goods transport from all sides (Senegal to the north and south and Guinea Bissau to the south).

Several factors place the Gambia at high risk of an EVD outbreak: its geographical location, cross-border market activities with neighbouring countries, in which large volumes of trucks, passenger vehicles and other travellers pass through on all sides, limited health care services and facilities, poor WASH systems, and traditional burial ceremonies. The Gambia is already vulnerable to outbreaks of diseases such as cholera and yellow fever and has limited resources to combat national health risks.

Participants

The sample includes data from 498 respondents. The interviews were conducted with the member of the household who is responsible for the care of the sick. In terms of gender, 434 (87.3%) of the respondents were female, and 63 (12.7%) were male. The age of the respondents ranged from 15 to 80 years (M = 35.89; SD = 13.22). On average, 12 people lived in the same household (SD = 7.68). The mean number of children under the age of five in the study households was three (SD = 1.92).

The household selection was based on random-route sampling, according to the protocol defined by Hoffmeyer-Zlotnik (2003), including every third household within a community. Interventions were implemented in all the communities, so most people living there should have experienced the interventions.

Procedure

The study was conducted in the Gambian households in May and June 2015. First, a qualitative pre-study was conducted including focus group discussions. Its objective was to gain knowledge about the barriers to and conditions facilitating EVD prevention behaviours. Then, a quantitative cross-sectional survey was conducted with structured face-to-face interviews using paper-and-pencil format. Each interview took around one hour and was held in one of the local languages: Jola, Mandinka, or Fula. A team of ten local health sector employees was recruited as interviewers. They attended five days of intensive training, during which they learned about the study, its goals and the theoretical background of the questionnaire. The data collectors practised interview techniques and the translation of the questions into the local languages. Two supervisors and the local collaborator coordinated and corrected the interviews and accompanied the data collectors in the field during the entire period of the data collection. All study participants provided their written informed consent prior to the interviews. The study received ethical approval from the School of Medicine and its allied Health Sciences Research and Publication Committee at the University of the Gambia.

Promotional activities

In the months before the survey took place, the local collaborator, Concern Universal, together with other local partners implemented four promotion activities to help prevent an EVD outbreak in the Gambia. The activities were household visits, posters with information about EVD at public places, EVD information sheets for the households, and the distribution of hygiene kits. The respondents were asked if they had experienced the EVD prevention promotions or not.

Questionnaire and measures

A structured questionnaire was developed and pre-tested for this study. The questionnaire was based on the psychosocial factors of the RANAS model (Mosler, 2012). Most of the questions were measured by using 5-point Likert scales. The questionnaire covered the following elements: socio-demographic characteristics, psychosocial factors for handwashing with soap, self-reported handwashing frequencies, the intention to follow the prevention instructions (to call the Ebola hotline, and not to touch a person who might be suffering from EVD) and cor-

responding psychosocial factors, measures of socio-economic status, remembered promotion activities, and attitudes towards them.

Additionally, frequency of communication about the Ebola hotline was included, because talking frequency is an important determinant of whether a person will change a certain behaviour or not (E. M. Rogers, 2010). Various studies have confirmed that communication plays an essential role in health behaviour change (e.g. Rimal, Flora, & Schooler, 1999).

The questionnaire was tested at the end of the interviewers' training to verify its applicability.

Handwashing with soap at critical junctures

To include the data from all respondents, only the handwashing moments after defecation and before eating were used for the analysis. The data collectors asked the respondents how often they washed hands after defecation and before eating. Answers were assessed on a 5-point rating scale from (almost) never to (almost) every time. A mean score was built with the two handwashing questions (Cronbach's alpha $\alpha = .75$).

Intention to follow prevention instructions

The intention to follow EVD prevention instructions, reporting a suspected EVD case to the Ebola hotline and not touching sick people, was operationalized through the behavioural intention and the behavioural willingness. Two direct questions were asked using self-reported 5-point Likert scales, from 1 (not at all) to 5 (very strongly) for calling the Ebola hotline and from 1 (not at all willing) to 5 (very willing) for not touching sick people (Cronbach's alpha $\alpha = .60$; see Table 12). The combined means of these items were used for the analyses.

Table 12:
Questions to measure the intention to follow the two prevention behaviours

Factor	Wording
Intention to call the Ebola hotline	How strongly do you intend to call the Ebola hotline if you have a person with suspected EVD in your household? Now we would like to ask you to imagine yourself in a certain situation. Suppose you have been at the market the whole day to sell vegetables. At the end of the day, you go home, and you find a member of your family who is vomiting, and the vomit contains blood, which could be a symptom for EVD. In those circumstances, how willing would you be to call the Ebola hotline and report the suspected EVD case in your household?
Intention not to touch someone who might be suffering from EVD	How strongly do you intend **to not touch** a sick person who might suffer from EVD in your household? Now we would like to ask you to imagine yourself in a certain situation. Suppose you have been at the market the whole day to sell vegetables. At the end of the day, you go home, and you find a member of your family who is vomiting, and the vomit contains blood, which can be a symptom for EVD. In those circumstances, how willing would you be to not touch the sick person, thus reducing the risk of contracting EVD?

Psychosocial factors

The psychosocial factors were measured as proposed in the RANAS model (Mosler, 2012). A description of the items can be found in Table 13. Each factor was measured with at least one item. In cases where two or more items were used to measure a factor, the mean of these items was used for the analyses. The How-to-do knowledge for calling the Ebola hotline was operationalized with a dichotomous item with responses coded as zero (did not know the number of the Ebola hotline) or one (knew the number).

Table 13:
Questions to measure the psychosocial factors for handwashing with soap and water

Factors	Description	Example Items
	Risks	
Community vulnerability	Subjective perception of the general probability of contracting a disease and subjective awareness of the personal risk of contraction.	How high do you think is the risk for an average person of your community to get EVD?
Vulnerability		How high do you feel is the risk that you get EVD?
Conditional vulnerability not protecting		How likely is it that you get EVD if you do not protect yourself with regular handwashing with soap and water at critical moments?
Conditional vulnerability protecting		How likely is it that you get EVD if you protect yourself with regular handwashing with soap and water at critical moments?
Severity	Subjective perception of the seriousness of an infection and the significance of the disease's consequences.	Imagine that you got EVD, how severe would be the impact on your life in general?
Health knowledge	Understanding of a disease's causes, personal consequences, and preventive measures.	Can people transfer EVD to others immediately after being infected?
	Attitudes	
Beliefs about costs and benefits (effort)	Beliefs about the monetary and non-monetary costs and benefits of a behaviour	Do you think that always washing hands with soap and water takes a lot of effort?
Beliefs about costs and benefits (time)		How time-consuming do you think is it to always wash hands with soap and water?
Beliefs about costs and benefits (costs)		Do you think that always washing hands with soap and water is expensive?
Beliefs about		Do you think that the handwashing facility is

Factors	Description	Example Items
costs and benefits (distance)		far away from your usual area of activity?
Response belief	Perceived positive aspects of engaging in a behaviour	How certain are you that always washing hands with soap and water prevents you and your family from getting diseases like EVD or diarrhoea?
Feelings (like)	Beliefs concerning the feelings associated with performing the behaviour	How much do you like always washing hands with soap and water?
	Norms	
Others' behaviour	Perceptions and awareness of which behaviours are typically practiced by others	How many people of your household always wash hands with soap and water?
Others' (dis)approval	Perceptions of which behaviours are typically approved or disapproved by others	People who are important to you (e.g. your family members, friends, a marabout, imam, other important people), how much do they approve that you always wash your hands with soap and water?
Personal importance	A person's beliefs about what she or he should do or should not do	How strongly do you feel a personal obligation to yourself to always wash hands with soap and water?
	Abilities	
How-to-do knowledge	A person's knowledge of how to execute the behaviour	How did the person wash her/his hands? (observation)
Confidence in performance	Perceived ability to perform a certain behaviour	How sure are you that you can always wash your hands with soap and water?
Confidence in performance (water)		How difficult is it to get as much water as you need to always wash hands with soap and water?
Confidence in performance (soap)		How difficult is it to get as much soap as you need to always wash hands with soap and water?
Confidence in performance		How difficult is it to find the time to wash hands with soap and water?

Factors	Description	Example Items
(time)		
Confidence in performance (distance)		How confident are you that you can wash hands with soap and water, even if you have to walk some distance to reach the next handwashing facility?
	Self-regulation	
Action planning	Planning of the behaviour, the when, where, and how of the behaviour	How much do you pay attention to always have enough soap at home to wash hands with soap and water?
Remembering	Perceived ease of remembering to practice the behaviour at the key moments	When you think about the last 24 hours: How often did it happen that you intended to wash hands with soap and water and then forgot to do so?
Commitment	The compulsion a person feels to practice a behaviour	How committed to you feel to wash hands with soap and water?
	Additional factor for calling the Ebola hotline	
Communication	Talking frequency	How often do you talk about the hotline you can call if you would have a suspected case of EVD in your household?

Notes. Response scales range from 1 – 5, 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly). For health knowledge a sum score of the correct answers was calculated. Equivalent items for calling the Ebola hotline and not touching a sick person.

Statistical analyses

Statistical analyses of the data were calculated with IBM SPSS 22 Statistics software. Frequencies, forced-entry multiple linear regression, and multiple mediation models were computed using the SPSS PROCESS macro (Hayes, 2012). Bootstrapping with 10,000 resamples was applied to estimate the confidence intervals of indirect effects. Only psychosocial factors that were significant predictors within the multiple linear regression analyses were included in subsequent mediation analyses. The specific indirect, direct, and total effects of promotional activities on EVD preventive behaviours were calculated. The specific indirect effect is the influence of a promotion (X) on the target behaviour (Y) via one psychosocial factor when

controlling for all other mediators (M) in the model. The direct effect refers to the remaining effect that X has on Y without passing through the mediators (M). The total effect is the sum of direct effects (c) and the direct effect (c`). Assumptions were met for all regression models.

Results

Reach of the promotional activities

The analyses included four different promotional activities or channels that promoted the preventive behaviours (see Table 14). The channel with the highest reach was the household visit, which reached 67% of respondents, followed by the poster with 63%. Nearly half of the respondents, 47%, received at least two items of the hygiene kit, and 39% of the respondents knew the EVD information sheet.

Table 14:
Overview of promotion activities and percentage of people who experienced the promotion

Ebola prevention promotion	**Description**	***% exp.***
Household visit	Main goal: Discuss the signs and symptoms of EVD, the transmission routes and hygiene behaviour for EVD prevention.	67%
Poster with information about EVD at public places	Main goal: Disseminate key messages how to protect yourself from EVD (handwashing with soap and water), reporting the EVD case to the Ebola hotline, the symptoms of EVD (headache, vomiting, fever, joint pain, bleeding).	63%
EVD information sheet for the household	Main goal: Disseminate key messages how to protect yourself from EVD (handwashing with soap and water), report the EVD case to a health facility and the symptoms of EVD (headache, vomiting, fever, joint pain, bleeding).	39%
Hygiene kits	Included soap, bleach, and material for a tippy tap, cups, a bucket and a flyer about EVD (only counted if someone received at least 2 items)	47%

Psychosocial factors associated with Ebola prevention behaviours

On average, respondents stated that they wash their hands with soap and water at most critical junctures. Handwashing after using the toilet was more frequently practised than handwashing before eating. For the analysis, the two critical junctures for handwashing with soap were combined (see Table 15). On average, the respondents said that they were willing and that their intention was strong to call the Ebola hotline if there was an EVD case in the household. The same was found for the intention not to touch someone who might be suffering from EVD (see Table 15). However, the results showed that 89.6% of the respondents did not know the number of the Ebola hotline.

Table 15:
Means (M) and standard deviations (SD) of handwashing, the intention to call the Ebola hotline and the intention not to touch someone who might be suffering from EVD

Juncture/Dependent variable	***N***	***M***	***SD***
After using the toilet	495	4.51	.74
Before eating	496	4.26	.99
Combined handwashing variable	496	4.38	.78
Calling the Ebola hotline	497	4.11	.78
Not touching	491	4.12	.94

Handwashing with soap and water

A multiple linear regression analysis was used to answer the first research question. The analysis revealed that six psychosocial factors significantly predicted the handwashing frequency (see Table 16). The model explains 48.5% of the variance in the self-reported handwashing frequency.

Conditional vulnerability not protecting (β = .149), meaning thinking that the probability of an infection with EVD is high if they do not protect themselves with regular handwashing, was significantly associated with handwashing. Cost belief costs (β = .124), meaning thinking

that always washing hands with soap is expensive, was associated with increased handwashing, as was Response belief (β = .123), meaning the perceived certainty that always washing hands with soap and water prevents diseases like EVD or diarrhoea. Furthermore, all three norm factors were significantly related to higher handwashing frequency: Others' behaviour (β = .305), meaning the perception that other family members and people in the village wash hands with soap and water; Others' (dis)approval (β = .123), meaning that people who are important to them at home or in the village approve of handwashing with soap and water; and Personal importance (β = .106), meaning the perception of handwashing as a personal obligation.

Table 16:
Linear regression analysis for psychosocial factors explaining handwashing with soap and water

Factor group	**Psychosocial factors**	***M (SD)***	***β***
Risk factors	Community vulnerability	2.86 (1.51)	.035
	Vulnerability	2.37 (1.48)	.098
	Severity	4.37 (0.88)	.069
	Health knowledge	18.93 (4.36)	.013
	Conditional vulnerability not protecting	3.88 (1.33)	.149**
	Conditional vulnerability protecting	2.11 (1.26)	-.023
Attitude factors	Cost belief effort	1.27 (0.73)	-.087
	Cost belief time	1.41 (0.86)	-.013
	Cost belief costs	2.44 (1.19)	.124**
	Cost belief distance	1.61 (0.99)	-.022
	Feelings - liking	4.40 (0.71)	.042
	Response belief	4.21 (0.89)	.123**
Norm factors	Others' behaviour	4.12 (0.76)	.305***
	Others'(dis)approval	4.26 (0.67)	.123**
	Personal importance	4.31 (0.65)	.106*

Factor group	Psychosocial factors	*M (SD)*	*β*
Ability factors	How-to-do knowledge	3.69 (0.70)	.074
	Confidence in performance	4.31 (0.82)	.058
	Confidence in performance water	1.77 (1.16)	-.006
	Confidence in performance soap	2.48 (1.20)	-.007
	Confidence in performance time	1.49 (1.01)	-.005
	Confidence in performance distance	4.07 (0.89)	-.068
Self-regulation factors	Action planning	4.03 (0.67)	.013
	Remembering	2.38 (1.41)	.050
	Commitment	3.11 (0.83)	.088

Note: $*p \leq .05$, $**p \leq .01$, $***p \leq .001$. Adjusted R^2=.485. N=422.

Calling the Ebola hotline

To answer the second research question, a multiple linear regression analyses was calculated. Four psychosocial factors were determined as significant predictors for the intention to call the Ebola hotline and to report a suspected EVD case in the household (see Table 17). The model explained a variance of 27.3% in the intention to call the Ebola hotline and report a suspected EVD case. A higher intention to call the Ebola hotline was significantly associated with Response belief (β = .195), meaning with study participants who think that calling the Ebola hotline will help the person who might be suffering from EVD. Then, the factor Others' behaviour household (β = .108), meaning that respondents who think that many people from their own household would call the Ebola hotline, contributed significantly to explaining the intention to call the Ebola hotline. Feeling committed to calling the Ebola hotline (β = .226) was the most important predictor for the intention to call the Ebola hotline. The factor Communication (β = .133), meaning that people who talk often about the Ebola hotline are more likely to have a higher intention to call the Ebola hotline than people who talk less often about it, was also a significant predictor.

Table 17:
Linear regression analysis for psychosocial factors explaining the intention to call the Ebola hotline and report a suspected EVD case

Factor group	Psychosocial factors	*M (SD)*	*β*
Risk factors	Community vulnerability	2.76 (1.52)	.089
	Vulnerability	2.30 (1.44)	-.022
	Severity	4.30 (.92)	-.040
	Health knowledge	18.87 (4.43)	.070
Attitude factor	Response belief	4.18 (.85)	.195***
Norm factors	Others' behaviour household	4.10 (1.18)	.108*
	Others' (dis)approval household	4.28 (.60)	.027
	Others' (dis)approval village	4.32 (.57)	.047
	Personal importance	4.21 (.64)	.096
Ability factors	How-to-do knowledge	*n. a.*	.008
	Confidence in performance	4.20 (.84)	-.014
Self-regulation factors	Commitment	4.45 (.61)	.226***
Additional factor	Communication	3.06 (1.38)	.133**

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001. Adjusted R^2=.273. *N*=467.

Not touching a person who might be suffering from EVD

To answer the third research question, another multiple linear regression analysis was calculated. The regression analysis revealed that five psychosocial factors significantly predicted the intention not to touch someone who might be suffering from EVD (see Table 18). The psychosocial factors explained 17.1% of the variance of the intention not to touch someone who might be suffering from EVD.

A higher intention not to touch a sick person was significantly associated with respondents who have a higher Health knowledge about EVD (β = .101) and with respondents who think that they are at risk if they touch a sick person who might have EVD (β = .114). The factor

Response belief (β = .148), meaning being certain that not touching a sick person who might have EVD prevents infection with EVD, was another significant predictor of the intention not to touch someone who might be suffering from EVD.

Furthermore, the factors Commitment to touch (β = .125) and Commitment not to touch (β = .250) correlated with a higher intention not to touch someone who might be suffering from EVD.

Table 18:
Linear regression analysis for psychosocial factors explaining the intention to not touch someone who might be suffering from EVD

Factor group	Psychosocial factors	*M (SD)*	*β*
Risk factors	Community vulnerability	2.76 (1.51)	.084
	Perceived vulnerability	2.28 (1.44)	-.011
	Perceived severity	4.29 (0.92)	-.019
	Health knowledge	19.01 (4.30)	.101*
	Conditional vulnerability touching	4.30 (0.99)	.114*
Attitude factor	Response belief	4.22 (0.85)	.148**
Self-regulation factors	Control not to touch	4.27 (0.71)	.019
	Commitment to touch	1.89 (1.26)	.125*
	Commitment not touch	4.22 (.83)	.250***

Note: *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$. Adjusted R^2=.171. N=467.

Mediation effects on implemented promotional activities

To answer the fourth research question, a multiple mediation analysis was conducted. The aim was to reveal which interventions were significantly associated with handwashing and the reason for this relation; this was achieved by specifying the psychosocial factors through which the promotional activities addressed the preventive behaviours. Subsequently, it can be shown which of the crucial psychosocial factors have not been tackled so far by the promotional activities.

Handwashing with soap

All significant predictors from the regression analysis were selected to examine the indirect and direct effects of promotional activities on handwashing by means of mediation analysis. Table 19 presents the association of the EVD promotions with the key psychosocial factors and their specific indirect, direct, and total effects on handwashing. Poster and home visit were associated with conditional vulnerability, response belief, others' behaviour, others' (dis)approval, and with personal importance, but not with cost belief. Info sheet was associated with cost belief and others' behaviour and hygiene kit was not associated with any of the key psychosocial factors and thus not with handwashing either. With regard to the specific indirect effects, home visit, poster and info sheet were significantly positively associated with increased handwashing behaviour through the psychosocial factors. Except cost belief, all included psychosocial factors mediated the promotions' association with handwashing. Further, all of the key psychosocial factors were significantly associated with at least one of the promotional activities.

Table 19:
Mediation analysis: effects of promotional activities on self-reported handwashing via psychosocial factors (mediators)

Promotional activity	**(a)**	**Psychosocial factors/Mediators**	**(b)**	**Specific indirect effect (a*b)** 95% CL [LL, UL]	**Direct effect (c')**	**Total effect (c)**
Poster	.55***	Cond. vulnerability not protecting	.13***	.07, [.03, .12]		
	.22	Cost belief	.03	.01, [-.00, .03]		
	.37***	Response belief	.14***	.05, [.02, .11]		
	.64***	Others' behaviour	.31***	.20, [.12, .29]		
	.19**	Others' (dis)approval	.10*	.02, [.00, .05]		
	.21**	Personal importance	.14**	.30, [.01, .07]		
					.20***	.57***
Home visit	.62***	Cond. vulnerability not protecting	.12***	.07, [.04, .12]		
	.05	Cost belief	.04	.001, [-.01, .02]		
	.48***	Response belief	.13***	.06, [.02, .12]		
	.69***	Others' behaviour	.30***	.21, [.13, .31]		
	.27***	Others' (dis)approval	.10*	.03, [.01, .07]		
	.33***	Personal importance	.15**	.05, [.01, .11]		
					.23***	.65***
Info sheet	.00	Cond. vulnerability not protecting	.13***	.00, [-.04, .03]		
	.54***	Cost belief	.03	.02, [-.01, .04]		
	.02	Response belief	.14***	.00, [-.02, .03]		

Promotional activity	**(a)**	**Psychosocial factors/Mediators**	**(b)**	**Specific indirect effect (a*b)** 95% CL [LL, UL]	**Direct effect (c')**	**Total effect (c)**
	.39***	Others' behaviour	.34***	.14, [.07, .21]		
	-.09	Others' (dis)approval	.09	-.01, [-.03, .01]		
	.01	Personal importance	.16**	.00, [-.02, .03]		
					.01	.16*
Hygiene kit	.04	Cond. vulnerability not protecting	.09**	.01, [-.05,.07]		
	-.15	Cost belief	-.02	.00, [-.01,.03]		
	.03	Response belief	.20***	.01, [-.06,.09]		
	.11	Others' behaviour	.36***	.04, [-.05,.13]		
	.01	Others' (dis)approval	.03	.00, [-.02,.02]		
	.20	Personal importance	.18**	.04, [-.01,.13]		
					.01	.09

*Note: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Displayed are unstandardized betas. Poster: N= 401, R^2 = .50 (b); Home visit: N= 400, R^2 = .49 (b); Info sheet: N= 401, R^2 = .47(b); Hygiene Kit: N=288, R^2 =.42. Number of bootstrap samples for bias corrected bootstrap confidence intervals: 10'000. Level of confidence for all confidence intervals: 95%*

Intention to call the Ebola hotline

Again, all significant predictors from the regression analysis were integrated in a mediation analysis, this time to examine the effects of promotional activities on the intention to call the Ebola hotline. The hygiene kit was excluded from the analysis because most items of the kit did not include information about the Ebola hotline. Table 20 presents the association of the EVD promotions with the key psychosocial factors and their specific indirect, direct, and total effects on the intention to call the Ebola hotline. Significant associations between the promotional activities and the key psychosocial factors were found for all three included promotions: Poster was associated with response belief, commitment and communication, while home visit was associated with response belief, others' behaviour, commitment and communication, and the info sheet was associated with others' behaviour and communication. Again, all of the key psychosocial factors were significantly associated with at least one of the promotional activities. When looking at direct effect, we can see that home visit is negatively associated with the intention to call the Ebola hotline. Not significant, but also negative is the direct effect of the poster on the intention to call the Ebola hotline. However, the direct effects are very small.

All included psychosocial factors mediated the promotions' association with the intention to call the Ebola hotline.

Table 20:
Mediation analysis: effects of promotional activities on calling the Ebola hotline via psychosocial factors (mediators)

Promotional activity	**(a)**	**Psychosocial factors/Mediators**	**(b)**	**Specific indirect effect (a*b)** 95% CL [LL, UL]	**Direct effect (c')**	**Total effect (c)**
Poster	.19*	Response belief	.23***	.04, [.01, .10]		
	.16	Others' behaviour household level	.07**	.01, [-.00,.04]		
	.26***	Commitment	.34***	.09, [.04, .17]		
	.46***	Communication	.08***	.03, [.01, .07]		
					-.13	.05
Home visit	.22*	Response belief	.18***	.04, [.01, .09]		
	.31*	Others' behaviour household level	.08*	.02, [.01, .06]		
	.38***	Commitment	.40***	.16, [.09, .25]		
	.54***	Communication	.08***	.04, [.01, .09]		
					-.15*	.11
Info sheet	-.09	Response belief	.23***	-.02, [-.07, .02]		
	.30*	Others' behaviour household level	.08*	.02, [.01, .06]		
	.04	Commitment	.31***	.01, [-.02, .06]		
	.95***	Communication	.06*	.06, [.01, .12]		
					.02	.09

*Note: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Displayed are unstandardized betas. Poster: N= 395, R^2 = .27 (b); Home visit: N= 394, R^2 = .27 (b); Info sheet: N=396, R^2 =.25 (b).Number of bootstrap samples for bias corrected bootstrap confidence intervals: 10'000. Level of confidence for all confidence intervals: 95%.*

No mediation analyses were executed for not touching a sick person. This was first because of the low explanation of the variance by the psychosocial factors in the intention not to touch someone who might be suffering from EVD. Second, because not touching a sick person was not promoted in the same way as handwashing with soap and water or as calling the Ebola hotline.

Discussion

This study aimed to identify the psychosocial factors through which the promotional activities that were evaluated addressed the EVD prevention behaviours. It is not only crucial to know whether a promotional activity increased behaviour or not; it is also crucial to understand the reasons for this effect. To achieve this, the underlying key determinants must be examined to identify which of them have been tackled by a promotional activity.

Psychosocial factors associated with EVD preventive behaviours

The models were able to explain essential substantial part of the variance of handwashing with soap (48.5%) and of the intention to call the Ebola hotline (27.3%). Less variance was explained for the intention not to touch a person who might be suffering from EVD (17.1%), meaning that we do not know clearly, which psychosocial factors are driving it.

The norm factors, especially others' behaviour, had a great impact on handwashing with soap and on calling the Ebola hotline. People who perceived that other people around them often wash hands with soap and water and believed that important others expect them to wash their hands tended to wash hands more often than others did. The more the respondents in this study perceived that many people from their own household would call the Ebola hotline, the higher was their own intention to call the Ebola hotline. Previous research has shown that norms are highly relevant with regard to handwashing behaviour (e.g. Aunger et al., 2010; Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016) and other behaviours including use of deep tube wells (Mosler et al., 2010) and use of contraceptive methods (Fekadu & Kraft, 2002).

The risk factor conditional vulnerability was also related to handwashing behaviour, meaning that respondents perceived the probability of contracting EVD as high if they did not protect themselves with regular handwashing with soap and water. That a perceived threat affects handwashing is consistent with previous research in emergency contexts: Curtis and colleagues (2009) found in their review of motivational, planning, and habitual factors of handwashing in 11 countries that handwashing frequency increased during cholera epidemics (Uganda, Senegal, Kenya and Peru) and sank again after the outbreak.

The factor conditional vulnerability touching was also a predictor for the intention not to touch a person who might be suffering from EVD. This means that respondents who felt that they were at risk if they touched a sick person who might have EVD were more likely to have a higher intention not to touch a person who might be suffering from EVD.

Further, the factor response belief, meaning the perceived certainty that a behaviour will prevent a disease, was a predictor for handwashing with soap and for the intention to call the Ebola hotline and not to touch a person who might be suffering from EVD. Response belief also explained stool-related handwashing in Haiti during the cholera outbreak (Contzen & Mosler, 2013). However, in this study, response belief is not only the belief that a certain behaviour, such as handwashing with soap or not touching a person who might be suffering from EVD, prevents contracting EVD; it is also the belief that the public health infrastructure and system is able to handle the epidemic. Together with commitment, response belief was the strongest predictor for the intention to call the Ebola hotline. This belief is crucial to preventing the spread of a disease such as EVD. If there is no trust in the health services, people will not go to health facilities, and this allows the virus to spread.

The factor commitment was the most important predictor of the intention to call the Ebola hotline and not to touch a person who might be suffering from EVD. Commitment strength's importance for various WASH behaviours in developing countries has been shown by several previous studies (Contzen & Mosler, 2015; Huber & Mosler, 2013; Inauen et al., 2013a; Sonego & Mosler, 2014).

In contrast, the factor commitment to touch explained the intention not to touch a person who might be suffering from EVD. Further analysis showed that 60 respondents, or 12%, of the study participants felt simultaneously committed to not touching and to touching someone who might be suffering from EVD. This might be explained by ambivalence and may be determined by culture and religion. Nevertheless, this fact could be crucial for preventing or curtailing the spread of EVD and should therefore be integrated in promotional activities.

The intention to call the Ebola hotline was significantly related to the factor communication, meaning that people who talked often about the Ebola hotline tended to have a higher intention to call the Ebola hotline than others. Communication plays an essential role in health behaviour change, which has been confirmed for example by Rimal and colleagues (1999) in their study about cardiovascular disease-related behaviours such as dieting, exercising, and smoking.

The factor health knowledge about the EVD was significantly associated with the intention not to touch someone who might be suffering from EVD. According to Bandura (2004), individuals are more likely to adopt a new behaviour if they have greater knowledge about the symptoms of a disease and about the prevention of the disease. On the other hand, various other studies have found that factual knowledge is secondary to a range of other factors (Biran et al., 2009; Contzen & Inauen, 2015; Hoque et al., 1996).

Effects of promotional activities

The promotions associated with handwashing were home visit, poster, and info sheet. Some other studies have also found positive effects of home visits (Agha & Van Rossem, 2002; Hussain, Aaro, & Kvale, 1997), while in the study by Contzen and Mosler (2013) home visits were negatively associated with handwashing behaviour. A study from Thailand (Pinfold, 1999) found that posters were significantly positively related to health knowledge, but showed a tendency to be negatively related to handwashing behaviour, and this was also the case in a study from Haiti (Contzen & Mosler, 2013). In an analysis of different communication channels for promoting hygiene behaviour, Pinfold (1999) found that printed media such as stickers, posters, and leaflets were associated with significantly higher scores in health knowledge than other channels. However, this positive effect could not be found for the behaviour. In our study, the hygiene kit did not have a significant association with handwashing, nor was it associated with any of the key psychosocial factors. Providing people with infrastructure alone and expecting that the target health behaviour will occur has been criticized by several authors (Cairncross & Shordt, 2004; Mosler, 2012; Sonego, Huber, & Mosler, 2013).

Promotional activities are only successful when they target the key psychosocial factors. The study results suggest that all key psychosocial factors, except cost belief, were mediators of the associations of home visit, poster, and info sheet with handwashing. These three promotional activities were effective in tackling handwashing behaviour because of the associations between the promotional activities and key psychosocial factors. This is an unexpected finding, considering that the content of the promotions was mainly to enhance factual knowledge about EVD. Therefore, it might be expected that conditional vulnerability and response belief would be mediators of the promotions with handwashing, but not the three norm factors others' behaviour, others' (dis)approval, and personal importance.

An explanation of this finding might be that the promotions unintentionally targeted the mediators. The promotor making the home visit might have enhanced the norm factors others' behaviour, others' (dis)approval, and personal importance, even though the promotion content did not directly tackle them. In case that a respected and trusted community health worker visited a house and discussed EVD and prevention behaviours with several families living together, at least the descriptive and injunctive norms would have been tackled. With regard to the posters, which were displayed in public places, the social norms when people read them and discuss their message in public might have been tackled. In the main, the handwashing promotional activities evaluated in this study were very successful in tackling the key psychosocial factors.

The analysis indicated that for the intention to call the Ebola hotline, the promotional activities were significantly related to all the relevant psychosocial factors. While none of the activities was directly associated with the intention to call the Ebola hotline, all included psychosocial factors mediated the promotions' association with the intention to call the Ebola hotline. Again, this is an unexpected result for some of the mediators. That the factor communication is a mediator, is not surprising, as at least the poster in public places and the home visit lead to discussions about the content of the promotion and thus also about the Ebola hotline. That response belief would mediate the promotions' association with the intention to call the Ebola hotline might have also been expected. It seems again that the promotions unintentionally targeted others' behaviour and commitment. In terms of the poster, it might be that the readers are already more committed to perform EVD prevention behaviours than people who did not read the poster. Home visit seemed to tackle also others' behaviour and commitment, what might be related to the performance of the promotor and the setting of the home visit. Nevertheless, home visit was negatively associated with the intention to call the Ebola hotline, meaning that the home visit seemed to lower the intention to call the Ebola hotline. An interpretation of this finding might be that respondents who have been visited by a promoter would rather report to this person in case of having a suspected case of Ebola in the house than calling the Ebola hotline. However, this effect was very small.

Practical implications

The findings of this study can serve as a baseline study for handwashing with soap and especially for the intention to call the Ebola hotline, as this behaviour was not the focus of the ac-

tivities implemented by the local NGOs. To change behaviour successfully, promotion activities must target those factors that are associated with behaviour. The findings of this study demonstrate that the norm factors, especially others' behaviour, response belief, and commitment, emerged as especially relevant to handwashing, the intention to call the Ebola hotline, and not touching a person who might be suffering from EVD. The greater relevance of social norms and other factors than risk factors to health behaviours has been shown in a multi-country review about socio-psychological determinants for safe drinking water consumption behaviours (Lilje & Mosler, 2017).

We found that home visit, poster, and info sheet were successful promotional activities in tackling handwashing behaviour and the intention to call the Ebola hotline, because they tackled the key psychosocial factors of the target behaviours. The RANAS model provides behaviour change techniques corresponding to psychosocial factors (Mosler & Contzen, 2016a). To increase handwashing behaviour, the five psychosocial factors underlying handwashing with soap have to be tackled. For example, community health workers that bear a picture of an opinion leader give people stickers (others' (dis)approval) washing his or her hands with soap and water. The sticker shows a text and an illustration about the approval of this opinion leader, mentions that people in that household wash their hands with soap at critical junctures and that they are good examples for others such as children (personal importance). For the other three crucial factors, a community meeting may increase the perception of what others are doing (others' behaviour) by providing the participants with a commitment sign to hang up outside their houses. A health worker can inform the participants about their personal risk (conditional vulnerability) and, together with a doctor from the health facility (others' (dis)approval) explain that handwashing with soap will protect them from EVD and diarrhoeal diseases (response belief).

For the intention to call Ebola hotline, five underlying psychosocial factors need to be targeted. In a radio advert, different kinds of people (others' behaviour household) could pledge their intention to call the Ebola hotline if there is the a suspected EVD case in their household (commitment). They say that they believe that this service has to be used to help the affected person and to protect other family members and the members of their community (response belief). At the end of the advert, they ask: "And you, do you also commit yourself to calling the Ebola hotline if there is a person who might be suffering from EVD in your household?" (commitment and communication).

Limitations

The results have to be interpreted with caution, because studies in an emergency context are especially prone to certain limitations. For ethical reasons, it is not appropriate to use a control group. Therefore, the present study was a cross-sectional study on the factors explaining EVD prevention behaviours and associations between promotional activities, psychosocial factors, and behaviour or behavioural intention. However, no conclusions can be drawn about causality.

Measuring handwashing by self-report has been criticized by several scientists (e.g. Biran et al., 2008; Pavani Ram, 2013). However, as the time for the survey was very limited, we could not directly observe handwashing behaviour. Therefore, an over-reporting bias for the frequency of handwashing with soap is very likely. It would be useful to include further measurements as proxies (Ruel & Arimond, 2002) in the analysis.

The present study did not include sociodemographic data and household wealth in the analyses. Seimetz and colleagues (2016) found that self-reported handwashing was not explained by factors like age, education level or marital status. Other researchers have suggested that higher education level and higher age are significantly related to self-reported handwashing frequencies (Tao et al., 2013; Tüzün et al., 2015). Regarding wealth, studies have found economic status to be significantly associated with hand cleanliness (Halder et al., 2010), soap availability in the household, and observed handwashing behaviour (Luby & Halder, 2008; P. K. Ram et al., 2010). In contrast, Ram and colleagues (2014) found in Senegal that none of their rapid handwashing measures were significantly related to observed handwashing behaviour in models including wealth. The same was found in their studies in Peru and Vietnam. However, comparison between studies is difficult. A study by Seimetz and colleagues (2016) into the influence of contextual and psychosocial factors on handwashing did not find wealth to be a predictor of self-reported handwashing frequencies. This means that the psychosocial factors fully explained the association of wealth with handwashing behaviour. Therefore, the authors conclude that hygiene promotions should focus on psychosocial factors instead of on sociodemographic factors.

The fact that some of the respondents might have experienced several promotional activities and that some combinations might have another effect on behaviour than others was not taken into account. Nevertheless, interaction effects should be considered in further studies. We did not integrate the attitudes of the respondents to the various promotional channels and activi-

ties in the analyses. Examining attributes of promotions such as the frequency of an experienced promotional activity, liking, its convincingness and its trustworthiness may be important when evaluating a promotion channel or activity.

Conclusion

The present study demonstrates that some EVD prevention promotions were associated with the target behaviour, and this was because they were associated with the key psychosocial factors steering the behaviour. Conversely, promotions that were not associated with the behaviour were not associated with the key psychosocial factors. The findings show the important role that psychosocial factors play in prevention behaviours during an EVD outbreak. Behaviour change programmes should use evidence to target the right psychosocial factors and thus maximize their effects on prevention behaviours, especially in emergency contexts. Social norms and response beliefs were revealed as crucial for the prevention of EVD in the Gambia. However, the used RANAS model focuses only on changes that can be achieved by individuals or households (Mosler, 2012). Changes on other levels, such as the institutional, political, or systemic, are often needed too in order to control an outbreak of a contagious disease like EVD and to change people's behaviour. A situation such as that in West Africa during the last outbreak of EVD requires adequate public health infrastructure, public health resources, and corresponding and culturally appropriate risk communication and health promotion. Different languages, dialects, clear illustrations to include illiterate people too, and aspects such as a strong tradition of oral communication and traditional beliefs also have to be considered in the communication (Bedrosian, 2016).

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Chapter IV

Predicting handwashing habit during an Ebola outbreak in Guinea-Bissau

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Abstract

Handwashing with soap and water is an effective standard precaution for infection control. Estimates suggest that up to one million individuals could be saved per year through the reduction of diarrheal diseases, acute respiratory infections, and other diseases. However, avoiding most health threats requires that healthy behaviours are maintained over time. One factor that sustains a given behaviour is habit. This paper investigates habit to enable the identification of its determinants. This study took place during the Ebola outbreak in Guinea, Sierra Leone, and Liberia. Cross-sectional quantitative data were collected from 1369 respondents in Guinea Bissau. The psychosocial factors were measured according to behaviour change models. Hierarchical multiple regression analyses were performed to identify the determinants of handwashing habit. Contextual factors accounted for 7% of the variance in handwashing habit. By including the psychosocial factors, 53% of the variance in handwashing habit could be explained. The factors most relevant to handwashing habit were gender, perceived vulnerability, perceived severity, beliefs about costs and time, others' (dis)approval, and confidence in performance. This study contributes to the evidence base on emergency handwashing interventions. Determining and addressing the factors that explain hygiene behaviours during emergencies and outbreaks is critical to helping prevent further transmission of diseases.

Keywords: Ebola prevention, emergencies and outbreaks, habit, handwashing, psychosocial factors, RANAS model.

Introduction

Previous research has demonstrated the effectiveness of handwashing with soap in reducing infectious diseases (Curtis & Cairncross, 2003). A systematic review of hand hygiene during recent outbreaks of Ebola virus disease (EVD) showed that handwashing with soap and running water is an effective standard precaution in preventing the spread of dangerous germs like Ebola (CDC, 2014). Improved hand hygiene is not only relevant in emergencies: Estimates suggest that up to one million individuals could be saved per year through the reduction of diarrheal diseases, acute respiratory infections, and other communicable diseases (Biran et al. 2012). However, rates of handwashing compliance are generally low. Freeman and colleagues's (2014) systematic review of worldwide handwashing practices found that handwashing after contact with feces is sparsely practiced: The authors estimate that on average 19% of the world's population wash their hands with soap after using the toilet. Therefore, substantial promotional activity is still needed to change this behaviour, especially in countries with a high burden of disease (Freeman et al., 2014).

Interventions usually aim at forming new behaviours or changing old behaviours. However, it is necessary to maintain health behaviour and hygiene behaviours in particular, over time to avoid most health threats. Achieving sustained health-behaviour change is difficult (Panter-Brick, Clarke, Lomas, Pinder, & Lindsay, 2006), and interventions that change handwashing behaviour both effectively and sustainably are in great demand. One factor that sustains a given behaviour is habit. Habitual or automatically initiated handwashing is therefore the ultimate goal of handwashing interventions (Lally, Wardle, & Gardner, 2011). Habit is hypothesized to have characteristics that make it relevant to changing health behaviour (Gardner, 2015), and these persist despite decreasing conscious motivation. According to Orbell and Verplanken (2010), a habit is a behaviour that is frequently repeated, has a high degree of automaticity, and is cued in stable contexts. Tobias (2009) established that habit development is an interplay between commitment strength, behaviour frequency, and cues such as a memory aid. According to Neal, Vujcic, Hernandez and Wood (2015) hygiene behaviours are very convenient for habit formation because they contain relatively unconscious, "reflexive" actions that are triggered automatically by familiar contextual cues (Wood & Neal, 2007). While the frequency of health behaviour, including the motivational processes driving behaviour, has often been addressed and assessed, the automaticity of health-related habit has been

empirically investigated less often. This may be related to the difficulty of measuring habit. The Self-Report Habit Index (SRHI) (Verplanken & Orbell, 2003), which is the most commonly used and validated measure of habit strength, includes automaticity.

The risks, attitudes, norms, abilities, and self-regulation (RANAS) approach was developed to predict health behaviour in developing countries and to design and evaluate behaviour change strategies (Mosler, 2012). It is an effective instrument for identifying psychosocial factors in the water, sanitation, and hygiene (WASH) and health sectors, and it serves as the theoretical background of the present study. The applicability of the approach has been demonstrated in various studies (Contzen et al., 2015; Contzen & Mosler, 2013; Gamma et al., 2017; Seimetz, Boyayo, et al., 2016; Sonego & Mosler, 2014). The model groups psychosocial factors into five blocks: Risk factors are all the factors that address the knowledge and awareness of the health risk. Attitude factors include beliefs about positive and negative stances towards a particular behaviour. Norm factors relate to perceived social influence. Ability factors include people's confidence in the performance of a particular behaviour. Self-regulation factors are the factors that are responsible for the continuation and maintenance of the behaviour.

This paper investigates habit as outcome measure to enable the identification of its psychosocial determinants, which can then be tackled by behaviour change interventions. Thus, the investigation begins by addressing this research question: Which psychosocial factors are related to habitual handwashing with soap and water at critical junctures during an EVD outbreak?

The RANAS model distinguishes social, physical, and personal contextual factors (Mosler & Contzen, 2016b). We included two factors from the personal context, age and gender, and one, wealth, from the social context. Socio-economic determinants have been associated with handwashing practices in several studies (Luby & Halder, 2008; Schmidt et al., 2009). Therefore, the study also addresses a second research question: Which contextual factors are related to habitual handwashing with soap and water at critical junctures during an Ebola outbreak?

Several studies have investigated the psychosocial factors underlying handwashing with soap in emergencies (Aunger et al., 2010; Contzen & Mosler, 2013; Curtis et al., 2009), but the habitual aspects of handwashing behaviour require more attention. Handwashing is largely habitual; it is a frequently performed behaviour practiced at specific times or in specific situations. Consequently, looking only at self-reported behaviour frequencies may prove unreliable when determining the psychosocial factors that explain it (Aunger et al., 2010; Devine et al.,

2012). When investigating handwashing habit and its relation to health behaviour, the distinction has to be considered between health as a long-term goal and the threat of an epidemic disease as an immediate danger (Curtis et al., 2009). In a review of planned, motivated, and habitual handwashing behaviour, Curtis and colleagues (2009) found that handwashing frequency increased during cholera epidemics (in Uganda, Senegal, Kenya and Peru). However, this frequency sank again after the outbreak, when the danger had passed. Fear of disease, which is represented in this study by the two RANAS factors perceived vulnerability and perceived severity, generally did not motivate handwashing, except in the case of an epidemic such as cholera (Aunger et al., 2010; Curtis et al., 2009). We assume that handwashing frequencies increase during an EVD outbreak, as the fear of EVD might be related to handwashing behaviour. Considering this and the results of habit research, our assumption is that risk factors, especially the perceived threat of EVD (perceived vulnerability and perceived severity), are associated with habitual handwashing.

Methods

Research area

Guinea-Bissau has one of the lowest human development indices in the world (UNDP, 2016). The study took place in all nine regions of Guinea-Bissau: Tombali, Quinara, Oio, Biombo, Bijagos, Bafatá, Gabú, Cacheu, and Bissau; it included rural, peri-urban, and urban regions.

Data collection procedure

Cross-sectional, quantitative data were collected in July and August 2015 using paper-and-pencil questionnaires in face-to-face interviews. Villages were selected randomly. The sample sizes in each region were determined relative to the population sizes of the regions. The interviews were conducted in Creole and Bijago, two of the local languages. Each interview took around one hour. Data were collected by a team of 20 national and local health sector employees. Five supervisors coordinated and monitored the data collection.

The data collectors were trained intensively for seven days on the methodology of the study, the theoretical background of the questionnaire, and the translation of the questions into the local languages. Ethical approval was obtained from the Ethical Committee of the Ministry of Public Health Guinea-Bissau. All study participants provided their informed consent.

Study population

Quantitative data were gathered from 1369 respondents. Both women (n = 744) and men (n = 625) were interviewed. Households were randomly selected using the random-route method (Hoffmeyer-Zlotnik, 2003). The mean number of people living in a household was 10 (SD = 7.22). Respondents' ages ranged between 15 and 87 years (M = 38.19, SD = 13.79). A third of the sample had never attended school (34%), while 17.6% of the sample had completed primary school, 14.4% secondary school, and 26.6% high school. The main type of livelihood was agriculture (47.8%) followed by daily labor (13.5%), formal work (12.6%, refers to ordinary employment arrangements), and commerce (11.2%). Guinea-Bissau is heterogeneous in ethnicity and religion, both between and within its regions. One hundred and thirty households (9.5%) did not want be interviewed.

Questionnaire

The interviews used a structured questionnaire developed for this study. The items covered socio-demographic characteristics, measures of socio-economic status, the psychosocial factors from the RANAS model (Mosler, 2012), questions about handwashing habit and self-reported handwashing frequency. One or more items were included in the questionnaire for each psychosocial factor. If a factor was measured by more than one item, these were combined into scales. The questionnaire's applicability was verified in a pre-test at the end of the interviewers' training (N = 20).

Handwashing habit

Habitual handwashing with soap and water was measured by seven items (see Table 21). Excepting one item, all items were taken from the SRHI (Verplanken & Orbell, 2003). Due to time constraints, only a subsample of the full set of questions was used. The questions that we selected addressed past behaviour frequency and the degree to which respondents felt that their behaviour was automatically performed.

We calculated Cronbach's alpha to assess the reliability of the habit measurements. This was $\alpha = .70$ for habit, so the measurements were considered sufficiently reliable that the single items could be combined into a habit scale.

Table 21:
Questions to measure handwashing habit

Variable name	Example item	*Scale (min/max)*
Habit	Do you wash your hands with soap and water automatically?	1-5
	Do you wash your hands with soap and water without thinking?	1-5
	Do you start washing your hands with soap and water before you realize you are doing it?	1-5
	Do you wash your hands with soap and water frequently?	1-5
	Do you think washing hands with soap and water is something you have been doing for a long time?	1-5
	How much do you feel that you wash your hands with soap and water as a matter of habit?	1-5
	Do you feel weird if you do not wash your hands with soap and water?	1-5

Notes. 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly).

Contextual factors

Three contextual factors were included in the analysis: age, wealth, and gender. For wealth, an index was compiled of certain items in the household: a computer, a fridge, a radio or a television, electricity in the house, a bicycle, a car, a carriage, a mobile phone, a motorbike or a scooter, and/or a boat with motor. The final scale ranged from 0 (no wealth) to 1 (high level of wealth).

Psychosocial factors

The psychosocial factors were measured according to the RANAS model (Mosler, 2012). For each factor, one or more items were used (see Table 22), and their means were averaged to provide a single mean for each factor. Most of the answers were measured using 5-point Lik-

ert scales ranging from 1-5. All items were unipolar. Health knowledge was assessed with multiple choice questions (Krebs, 2010), and a sum score was built.

Table 22:
Questions to measure the psychosocial factors for handwashing with soap and water

Factors	**Description**	**Questions**
Risks		
Vulnerability	Subjective perception of the general probability of contracting a disease and subjective awareness of the personal risk of contraction.	How high do you feel is the risk that you get EVD?
Conditional vulnerability protecting		How likely is it that you get EVD if you protect yourself with regular hand washing with soap and water at critical moments?
Severity	Subjective perception of the seriousness of an infection and the significance of the disease's consequences.	Imagine that you contracted EVD, how severe would be the impact on your life in general?
Health knowledge	Understanding of a disease's causes, personal consequences, and preventive measures.	Can people transfer EVD to others immediately after being infected?
Attitudes		
Beliefs about costs and benefits (effort)	Beliefs about the monetary and non-monetary costs and benefits of a behaviour	Do you think that always washing hands with soap and water takes a lot of effort?
Beliefs about costs and benefits (time)		How time-consuming do you think is it to always wash hands with soap and water?
Beliefs about costs and benefits (costs)		How expensive is it for you to always wash hands with soap and water?
Beliefs about costs and		Do you think that the handwashing facility is far away from your usual area of

Factors	Description	Questions
benefits (distance)		activity?
Response belief	Perceived positive aspects of engaging in a behaviour	How certain are you that always washing hands with soap and water prevents you and your family from getting diarrhea? How certain are you that always washing hands with soap and water prevents you and your family from getting EVD?
Feelings (like)	Beliefs concerning the feelings associated with performing the behaviour	How much do you like always washing hands with soap and water?
Norms		
Others' behaviour	Perceptions and awareness of which behaviours are typically practiced by others	How many people of your household always wash hands with soap and water?
Others' (dis)approval	Perceptions of which behaviours are typically approved or disapproved by others	People who are important to you (e.g. your family members, friends, a marabout, an imam, other important people), how much do they approve that you always wash your hands with soap and water?
Personal importance	A person's beliefs about what she or he should do or should not do	How strongly do you feel a personal obligation to yourself to always wash hands with soap and water?
Abilities		
Confidence in performance	Perceived ability to perform a certain behaviour	How sure are you that you can always wash your hands with soap and water?
Confidence in performance (water)		How difficult is it to get as much water as you need to always wash hands with soap and water?
Confidence in performance (soap)		How difficult is it to get as much soap as you need to always wash hands with soap and water?

Factors	Description	Questions
Confidence in performance (time)		How difficult is it to find the time to wash hands with soap and water?
Confidence in performance (distance)		How confident are you that you can wash hands with soap and water, even if you have to walk some distance to reach the next hand washing facility?
Self-regulation		
Action planning	Planning of the behaviour, the when, where, and how of the behaviour	How much do you pay attention to always have enough soap at home to wash hands with soap and water?
Remembering	Perceived ease of remembering to practice the behaviour at the key moments	When you think about the last 24 hours: How often did it happen that you intended to wash hands with soap and water and then forgot to do so?
Commitment	The compulsion a person feels to practice a behaviour	How committed to you feel to wash hands with soap and water?

Notes. Response scales range from 1 – 5, 1 indicates the lowest value on the scale, and 5 represents the highest value on the scale (1 = not at all, 2 = a little, 3 = medium, 4 = strongly, 5 = very strongly). For health knowledge, the sum of correct answers was calculated.

Data analyses

To identify the contextual and psychosocial factors associated with handwashing habit, a hierarchical multiple regression analysis was performed with two steps. In the first step of the model, only contextual factors were included. In the next step, the factors from the RANAS model were added. Assumptions of no multicollinearity, linearity, independent and normally distributed errors, and homoscedasticity were met for both regression models. The analyses were conducted with SPSS version 22 (IBM-SPSS Inc, Armonk, NY).

Results

Descriptive statistics

On average, respondents reported having a medium handwashing habit (M = 3.58, SD = .69). The average age of the 744 female and 625 male respondents was 38 years (M = 37.96, SD = 14.03), and the respondents owned on average a third of the household items of the household wealth index, which ranged from 0 to 1 (M = .32, SD = .18).

All predictor variables were significantly correlated with handwashing habit. Bivariate analyses showed that intercorrelations among predictor variables were all below .70. Therefore, all predictors were kept in the analyses. A hierarchical linear regression was conducted to examine the specific predictive power of contextual factors and psychosocial factors on handwashing habit.

Regression models

Table 23 shows the hierarchical regression results for handwashing habit. Contextual factors, tested separately in step 1 of the model, accounted for 7% of the variance in handwashing habit. By including the psychosocial factors from the RANAS model, the amount of explained variance increased significantly to 53% (see step 2 in Table 23).

The standardized regression coefficients (β) from Model 2 were considered to identify the explanatory factors. The most important factors were the following: gender, perceived Vulnerability, perceived Severity, Beliefs about costs and time, Others' (dis)approval, and three different Confidence in performance factors (general, soap, distance). Finding gender (β = .112) to be a significant predictor means that women more often reported having a strong handwashing habit than men did. Respondents who felt less at risk that they or someone in their household could contract EVD showed higher values for handwashing habit than others (perceived Vulnerability, β = -.088, high risk perception coded as 5, meaning the higher the risk perception, the higher the value on the answer scale). Higher values for the perceived impact of contracting EVD on life (perceived Severity, β = .114) correlated with a higher handwashing habit. Thinking that always washing hands with soap is not time-consuming (Beliefs about costs and benefits (time), β = .190) was associated with increased handwashing

habit. Perceiving handwashing as expensive (Beliefs about costs, β = -.158), was significantly negatively related to higher handwashing habit. Others' (dis)approval (β = .277), meaning people perceive that important others approve of handwashing with soap and water, was associated with a strong handwashing habit. Respondents who are sure that they can always wash their hands with soap and water when needed (Confidence in performance, β = .104), who thought it is not difficult to get enough soap for handwashing (Confidence in performance soap (β = .093), and who felt confident in being able to wash hands with soap even if they have to walk some distance to reach the next handwashing facility (Confidence in performance distance, β = .135) all showed significant association with a higher handwashing habit.

Other significant predictors were Health Knowledge, Personal Importance, and Action Planning. Respondents who reported a greater health knowledge (β = .046), a higher personal importance (β = .066), and higher values for action planning were significantly related to handwashing habit. A tendency to be a predictor for handwashing habit has been found for age (β = .043), Conditional Vulnerability Protecting (β = .049), Response belief Diarrhea (β .051) and for Response belief EVD (β = .056).

Table 23:
Hierarchical multiple regression analysis explaining handwashing habit in Guinea-Bissau

	M/n	**SD/%**	***b***	***b* SE *b***	**ß**	***p***
Step 1						
Age	37.96	14.03	.001	.001	.019	.526
Household wealth	.32	.18	.481	.104	.129	.000
Gender	.54	.50	.311	.041	.228	.000
Step 2						
Age			.002	.001	.043	.052
Household wealth			.038	.080	.010	.637
Gender			.154	.033	.112	.000
Vulnerability	2.34	1.34	-.045	.013	-.088	.000
Conditional vulnerability protecting	3.73	1.46	.023	.012	.049	.055

	M/n	**SD/%**	***b***	***b* SE *b***	**ß**	***p***
Severity	4.46	.70	.115	.024	.114	.000
Health knowledge	19.49	4.75	.007	.003	.046	.042
Feelings (like)	4.39	.63	.032	.030	.028	.290
Response belief Diarrhea	4.21	.85	.043	.024	.051	.073
Response belief EVD	4.29	.74	.054	.028	.056	.053
Beliefs (time)	4.42	.91	.146	.016	.190	.000
Beliefs (costs)	3.62	1.35	-.080	.011	-.158	.000
Beliefs (distance)	4.47	1.02	-.007	.014	-.010	.635
Others' behaviour	3.89	.80	-.001	.022	-.001	.973
Others' (dis)approval	3.20	.82	.233	.022	.277	.000
Personal importance	4.06	.75	.063	.024	.066	.010
Confidence in performance	4.23	.73	.101	.026	.104	.000
Confidence in performance (water)	4.52	.96	.007	.017	.009	.702
Confidence in performance (soap)	4.46	.87	.073	.019	.093	.000
Confidence in performance (time)	4.80	.61	-.017	.027	-.015	.524
Confidence in performance (distance)	4.09	.78	.124	.023	.135	.000
Action planning	4.01	.72	.062	.025	.061	.015
Remembering	4.56	.88	-.021	.018	-.027	.224
Commitment	4.11	.72	.031	.024	.032	.194

Note. b, unstandardized regression coefficient. SE b = standard error. Adjusted R^2= .07, ΔF = 28.288, p < .001 (step 1). Adjusted R^2 = .53, ΔF = 55.386, p < .001 (step 2). ΔR^2 = .46. For gender: 0 = male, 1 = female. Handwashing habit and all psychosocial variables ranged from 1 to 5. N = 1226.

Discussion

The present study aimed to identify the contextual and psychosocial predictors of habitual handwashing with soap and water during an EVD outbreak. Based on these predictors, interventions can be designed to achieve more sustained handwashing behaviour.

Summary and interpretation of the results

The relevant contextual factors were gender and age. Being female correlated with a stronger handwashing habit. This might relate to the fact that women are more often responsible for childcare and the preparation of food than men, and that they therefore have a stronger handwashing habit than men. Older respondents tended to have a stronger handwashing habit than younger respondents. Having a high score on the wealth index was significantly related to a strong handwashing habit in the first step of the regression model, the model with the contextual factors alone. However, when we added psychosocial factors, the association of wealth with handwashing habit was mediated through these psychosocial factors. It could thus be argued that the contextual factors were subsumed within the psychosocial factors. This finding is in line with another study that used the RANAS approach to identify contextual and psychosocial factors predicting EVD prevention behaviours (Gamma et al., 2017). The finding that psychosocial factors are highly predictive for handwashing behaviour is in line with several previous findings (Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016). When looking at wealth, poverty, infrastructure, and handwashing alone, other studies have found similar results (Luby & Halder, 2008; Schmidt et al., 2009).

Some risk factors, such as perceived vulnerability, were negatively related to handwashing habit, while others were positively related: perceived severity, conditional vulnerability protecting, and health knowledge. A negative association between perceived vulnerability and handwashing has also been found in previous handwashing studies (Contzen & Mosler, 2015; Devine et al., 2012), and for other health behaviours, such as exercising and cancer screening (Norman et al., 2005). This might be explained by reverse causality; people who protect themselves by washing hands often feel less vulnerable to contracting diseases such as diarrhea and EVD. This explanation is supported by the fact that the factor conditional vulnerability protecting tended to be positively associated with handwashing habit. This means that re-

spondents who perceived the probability of an infection with EVD as less likely if they protected themselves by regular handwashing showed a stronger handwashing habit than others. The perceived severity also correlated with handwashing habit. However, in major behaviour change theories, risk factors and fear of disease are not seen as the most important factors affecting the performance of health behaviours (Conner, 2010). A meta-analysis of studies that applied the Protection Motivation Theory (Maddux & Rogers, 1983; R. W. Rogers, 1975), in which threat appraisal is a core factor, found that the variables of threat appraisal, perceived vulnerability and perceived severity, had weaker effects on intention and behaviour than those of coping appraisal (Norman et al., 2005). However, risk factors have been found to be relevant for prevention behaviours in the case of epidemics such as cholera and EVD (Curtis et al., 2009; Gamma et al., 2017), and we confirmed this relevance in the present study. We also confirmed our assumption that risk factors, especially the perceived threat of EVD (perceived vulnerability and perceived severity), are associated with habitual handwashing. A tendency for the two response beliefs (response belief diarrhea and response belief EVD) has been found. These factors reflect expectations about outcome and are important behavioural determinants in several health and behaviour change theories, such as Bandura's social cognitive theory (Bandura, 1986), the health belief model (Rosenstock, 1974), and the health action process approach (Schwarzer, 2008). In addition, attitude factors concerning time and costs contributed to explaining handwashing habit in this study. Respondents with a stronger handwashing habit perceived handwashing as less time-consuming and as more expensive than respondents with a weaker handwashing habit. A possible explanation of this result is that people with a stronger habit know that handwashing does not take a lot of time but that always making sure that enough soap and water is available requires some expense.

In this study, others' (dis)approval was the factor with the highest explanatory power. Others' (dis)approval, or injunctive norms, describe the personal expectations of behaviour set by people and institutions outside the individual (Cialdini et al., 1990). The same factor was highly relevant for handwashing behaviour in Haiti and Ethiopia (Contzen & Mosler, 2015), and an eleven-country review by Curtis and colleagues (2009) found that affiliation, meaning conformity with local norms, was a key motivator for planned, motivated, and habitual handwashing with soap. During the EVD outbreak, faith or religious leaders, highly trusted and respected members of communities, played an important role as agents of social change (Featherstone, 2015). They can be characterized by many positive attributes: Faith leaders often have a leadership role in their communities; they are highly motivated to support their

communities; they have access to the most remote parts of the countries; they have a deep knowledge of the population in their region; and, in contrast to the staff turnover in NGOs and in government, they occupy long-term leadership positions. Therefore, aid agencies worked closely with faith leaders to teach communities about the importance of preventive behaviours during the outbreak of EVD in Guinea, Liberia and Sierra Leone.

Confidence in being able to wash hands when required, confidence in having soap available, and confidence in being able to wash hands even if the next handwashing facility is quite distant were also predictors of handwashing habit. According to Bandura (Bandura, 1986), confidence in performance, or self-efficacy, is a key factor steering behaviour. Confidence in performance has been found to be a predictor for various other habitual health behaviours: for the habitual use of arsenic-safe water options in Bangladesh (Inauen, Tobias, & Mosler, 2013b), for habitual latrine cleaning behaviour in Burundi (Sonego & Mosler, 2014), and for the habitual cleaning of water storage containers in Benin (Stocker & Mosler, 2015).

Implications for practice

We suggest that hygiene promotion programmes consider various factors relevant to handwashing habit. Our findings indicate that many other factors besides health knowledge and awareness of the importance of handwashing are crucial for handwashing habit. Based on our results, we recommend that health programmes should focus on psychosocial factors and not on contextual factors such as household wealth. This is because the psychosocial factors seem to be more proximal to the outcome measurement (Flay et al., 2009), and the effects of contextual factors lack consistency. The fact that gender was a significant predictor for handwashing habit could be considered by tailoring interventions to specifically target men. If the promotion were to prevent a contagious disease such as EVD, this would be appropriate.

To tackle particular factors from the factor blocks of the RANAS model, Mosler and Contzen (2016a) provide a catalogue of behaviour change techniques appropriate to each factor. To enhance the factor perceived vulnerability, they suggest informing about and assessing personal risk. This includes assessing the personal risk of an individual so that that person understands both their personal health risk and that other people in the household may be put at risk by their behaviour. The importance of handwashing with soap and water at all critical moments is emphasized, and the critical moments for handwashing are discussed. Threatening

information that stresses the perceived severity of contracting EVD is used, for instance by means of pictures.

The perceived costs and time for handwashing with soap and water can be addressed with a cost-benefit analysis. This includes the monetary costs, the time required, and the health and social consequences of handwashing. A health promoter works with the household to calculate how much they spend on soap and water for handwashing per week and how much time it takes to wash hands with soap and water at all key moments. These results are compared to the medical costs and the time of treatment in a health facility if someone suffers from EVD.

Others' (dis)approval can be targeted by pointing out that important others support the desired behaviour or that they disapprove of the unhealthy behaviour. For example, a faith leader communicates his approval of washing hands with soap and water at critical junctures at a community meeting; he says he would be proud to be the faith leader of a village where people wash their hands at key moments to protect the community from EVD.

Confidence in performance of handwashing can be boosted by prompting and supporting the community or households to construct handwashing stations near where handwashing is mostly required, typically next to the cooking place and the toilets. This is in line with other studies that have shown that having a designated place for handwashing is related to higher handwashing frequencies (Devine et al., 2012; Luby & Halder, 2008). Contzen and colleagues's (2015) evaluation of a handwashing infrastructure campaign concluded that having a designated place for handwashing not only facilitates handwashing but also serves as a reminder and strengthens the social norm of handwashing behaviour. Environmental cues can trigger automatically initiated behaviour, but an important condition for these environmental cues is that they are immediately available, such as a designated place for handwashing with soap and water near the toilet and near the area where food is prepared (Neal et al., 2015).

Strengths and limitations

To our knowledge, this is the first study to examine the contextual and psychosocial factors associated with handwashing habit during an EVD outbreak. Previous studies about handwashing habit have not covered many factors from behaviour change theories. Nonetheless, our findings need to be interpreted with limitations in mind. We only used self-report measures. Several researchers have criticized measuring handwashing by self-report (Biran et

al., 2008; Pavani Ram, 2013). Due to time constraints, the survey could not include direct behavioural observations, and therefore, an over-reporting bias for handwashing frequency is quite likely. Nevertheless, our goal was to assess the relative impacts of the various contextual and psychosocial factors on handwashing habit and not to report absolute handwashing rates. As the study was cross-sectional and we reported on correlations between contextual and psychosocial factors and the handwashing habit, no causal conclusions can be drawn. Longitudinal data are needed to measure and investigate handwashing habit formation over time.

Conclusions

Despite the fact that many daily activities may be habit driven (Wood et al., 2002), habit has not yet been investigated to the same extent as other outcome measures in the behaviour change literature, and particularly not in developing countries. This study provided important new evidence on contextual and psychosocial factors associated with handwashing habit during an EVD outbreak; these can now be targeted in future handwashing campaigns during outbreaks of contagious diseases. We found that a strong handwashing habit is more likely in women than in men. This fact may play an important role in the transmission of contagious diseases such as EVD and needs to be taken into account when designing handwashing promotion campaigns. Beliefs about costs and time and especially others' (dis)approval have been shown to be associated with handwashing habit. This study contributes to the evidence base on emergency handwashing interventions. Determining and addressing the factors that explain hygiene behaviours during emergencies and outbreaks is critical to helping prevent further transmissions of diseases, to sustaining behaviour change, and so to reducing the impact of disease on the health of a population.

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Chapter V

General discussion

1 Summary

This discussion focuses on the general implications of the three studies. Prevention behaviours are key to avoiding the spread of infectious diseases and to reducing their occurrence, particularly in developing countries with poor WASH conditions during outbreaks of contagious diseases. Nevertheless, rates of, for instance, handwashing are remarkably low, and evidence is needed of what steers prevention behaviours in emergency and outbreak situations. Evaluations of disease response interventions are also highly relevant. The aim of this thesis was to contribute to the understanding of contextual and psychosocial determinants of EVD prevention behaviours during an EVD outbreak. This was done by explaining EVD prevention behaviours and by testing the effectiveness and mode of operation of EVD prevention interventions in Guinea-Bissau and the Gambia during the EVD outbreak in the neighbouring countries of Guinea, Liberia and Sierra Leone 2014-2016. In this specific context, the role of a perceived threat, the EVD, and its relation with prevention behaviours was investigated in Studies 1 and 2. In Study 3, predictors of habitual handwashing were determined to identify predictors of more sustained handwashing behaviour. The comparison of several EVD prevention behaviours (not touching someone who might be suffering from EVD, reporting suspected cases to the Ebola hotline, self-reported handwashing frequency, and habitual handwashing) in two countries contributes to the generalizability of the psychosocial factors from the RANAS model (Mosler, 2012; Mosler & Contzen, 2016b) in outbreak situations and provides evidence supporting public health practices in outbreak settings.

The results of the empirical studies were discussed in detail in the respective chapters. Nevertheless, this discussion section begins with a summary of the most important findings. Table 24 provides an overview of the aims, research questions, findings, and major conclusions. The implications for theory and practice are then discussed. These are followed by strengths and limitations of this research. The chapter V ends with a general conclusion.

Table 24: Overview of this thesis's main findings

Aim	Research question	Chapter	Findings	Conclusion
Identify contextual determinants of EVD prevention instructions	Which contextual factors predict the intention to follow EVD prevention instructions?	II	Age, wealth, and having a mobile phone were most strongly associated with the intention to call the Ebola hotline. When psychosocial factors were added to the model, only age remained a significant predictor. Literacy and wealth were most strongly associated with the intention not to touch someone who might be suffering from EVD. Neither were significant predictors when analysed with the psychosocial factors. The model fit was low for both behavioural intentions.	Contextual factors can only explain small proportions of the variance in the intention to follow EVD prevention instructions. Only age and gender remained significant predictors of EVD prevention behaviours when the psychosocial factors were entered into the models.
	Which contextual factors are related to habitual handwashing with soap and water at critical junctures during an EVD outbreak?	IV	Gender, meaning that women more often reported having a strong handwashing habit than men did, and age were significant contextual predictors of handwashing habit. A high score on the wealth index was significantly related to a strong handwashing habit in the model with the contextual factors alone. However, when we added psychosocial factors, the effect of wealth was mediated through these psychosocial factors, and wealth did not remain a predictor.	
Identify psychosocial determinants of EVD prevention instructions	Which are the crucial psychosocial factors for the intention to follow EVD prevention instructions?	II	Risk factors (perceived severity, factual knowledge), response belief, norm factors (descriptive and injunctive norm household, personal norm), self-efficacy, and commitment were predictors of the intention to report a suspected EVD case to the Ebola hotline. The model fit was good.	Psychosocial factors can explain the intention to perform EVD prevention behaviours well. In particular,

Aim	Research question	Chapter	Findings	Conclusion
			Risk factors (perceived severity, factual knowledge, risk touching), response belief, self-efficacy, and two items[10] regarding the opinion of others if the behaviour is performed were revealed as predictors of the intention not to touch someone who might be suffering from EVD. The model fit was medium.	risk factors, response belief, norm factors, and self-efficacy were associated with intended EVD prevention behaviours.
	Which are the crucial psychosocial determinants of handwashing with soap at critical junctures under the threat of EVD?	III	Conditional vulnerability[11], cost beliefs, response belief, and norm factors (descriptive, injunctive and personal norm) were significantly related to higher self-reported handwashing frequency. The model fit was good.	
	Which are the crucial psychosocial determinants of the intention to call the Ebola hotline to report a suspected case of EVD?	III	Response belief, descriptive norm household, commitment, and communication were significant predictors for the intention to call the Ebola hotline. The model fit was medium.	
	Which are the crucial psychosocial	III	Factual knowledge, conditional perceived vulnerability touching[12], response belief, commitment to touch,	

[10] Two items regarding the opinion of others if the behaviour is performed: people who think that others would see them as not a nice person and as a person who does not want to help.

[11] Conditional vulnerability not protecting: thinking that the probability of an infection with EVD is high if they do not protect themselves with regular handwashing.

[12] Respondents who think that they are at risk if they touch a sick person who might have EVD.

Aim	Research question	Chapter	Findings	Conclusion
	determinants of the intention not to touch someone who might be suffering from EVD?		and in particular commitment not to touch were related to the intention not to touch someone who might be suffering from EVD. The model fit was medium.	
Evaluate if implemented promotion tackled key psychosocial factors of target behaviours	Which promotional activities are associated with which psychosocial factors and are through these factors associated with the preventive behaviours?	III	Three promotional activities were significantly associated with some or all of the key psychosocial factors of handwashing and thus with increased handwashing behaviour: home visit, poster, and info sheet. The hygiene kit was not associated with any of the key psychosocial factors or with handwashing. None of the promotional activities was significantly associated with increased intention to call the EH. Home visit was directly and negatively associated with the intention to call the EH, meaning that this interventions was associated with the intention to call the EH through additional factors which have not been considered in this model.	Home visit, poster, and info sheet were targeting some or all of the key psychosocial predictors of the EVD prevention behaviours.
Identify psychosocial determinants of habitual handwashing	Which psychosocial factors are related to habitual handwashing with soap and water at critical junctures during an EVD out-	IV	Risk factors (perceived vulnerability, perceived severity, factual knowledge), response belief EVD, beliefs about costs and time, injunctive and personal norm, self-efficacy (general, having soap, distance to handwashing facility), and action planning were related to a higher handwashing habit. The model fit was good.	The psychosocial factors can explain handwashing habit well. Especially risk factors, affective beliefs, injunctive norm and

Aim	Research question	Chapter	Findings	Conclusion
	break?			self-efficacy were key.
	Assumption: Risk factors, especially the perceived threat of EVD (vulnerability and severity), are associated with habitual handwashing.	IV	The assumption can be confirmed: Risk factors, especially the perceived threat of EVD (perceived vulnerability and perceived severity), are associated with habitual handwashing.	

2 Implications for health behaviour theory

This section discusses the main findings regarding the key determinants of health behaviours in outbreak situations. First, the findings from the three empirical studies of this thesis are discussed to provide an overview of the contextual and psychosocial factors explaining EVD prevention behaviours.

2.1 Determinants of Ebola prevention behaviours

All three empirical studies of this thesis systematically assessed the psychosocial determinants of at least one of the following EVD prevention behaviours: the intention not to touch someone who might be suffering from EVD, the intention to report a suspected EVD case to the Ebola hotline, handwashing, and handwashing habit. This is an important first step to explaining and predicting behaviour, and this knowledge can be used to develop effective health promotion interventions. However, the relative degree of relation between a contextual or psychosocial factor and a behaviour can be assessed, meaning that the studies can show which psychosocial factors are associated with the target behaviours, which ones are only associated with some of the target behaviours, and which ones do not seem to be relevant. Risk factors, response beliefs, cost beliefs, norm factors, self-efficacy, and commitment were particularly associated with the intention to perform EVD prevention behaviours.

Generally, the findings showed that psychosocial factors could explain the variance in disease prevention behaviours well. In Study 1 and Study 3, the regression models were first tested with the contextual factors alone, which did not explain much of the variance in the intention to perform EVD prevention behaviours or in handwashing habit. The inclusion of the psychosocial factors led to a substantial increase in the explanatory power of the models. Study 1 explained almost 50% of the variance in the intention to call the Ebola hotline and almost 30% of the variance in the intention not to touch someone who might be suffering from EVD. Study 2 explained nearly 50% of the variance in handwashing, nearly 30% of the intention to call the Ebola hotline, and nearly 20% of the variance in the intention not to touch a person who might be suffering from EVD. Study 3 explained over 50% of the variance in handwashing habit.

The findings emphasize the great importance of psychosocial factors for EVD prevention behaviours. The same has been revealed in previous research (Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016). These factors need to be considered in the development of behaviour change interventions and health education for EVD prevention. Nevertheless, a model that also includes contextual factors is more comprehensive in explaining behaviour formation. The following section discusses some of these findings.

2.1.1 Contextual determinants of Ebola prevention instructions

The RANAS approach (Mosler, 2012; Mosler & Contzen, 2016b) suggests that the social, physical, and personal context influences behaviours and behavioural intentions. This thesis examined whether and how contextual factors are associated with different EVD prevention behaviours. Even if the contextual factors were not studied comprehensively and were only integrated into two of the three empirical studies of this thesis, the relative effects of the contextual factors on EVD prevention behaviours were assessed. In general, the contextual factors did not explain much of the variance in the intention to follow the two prevention instructions. In Study 1, only 7.1% of the variance in the intention to call the Ebola hotline could be explained by the contextual factors and only 1.4% of the variance in the intention not to touch someone who might be suffering from EVD. In Study 3, contextual factors accounted for 7% of the variance in handwashing habit. Although age, wealth, and having a mobile phone were explaining the intention to call the Ebola hotline, literacy and wealth were explaining the intention not to touch someone who might be suffering from Ebola and wealth was explaining handwashing habit in the analyses with the contextual factors, they were no longer predictive when the psychosocial factors were added to the models. It could thus be argued that the contextual factors are subsumed within psychosocial factors, meaning that the effect of the contextual factors was indirect; contextual factors were fully or partially mediated and represented through the psychosocial factors. This is in line with previous research on the contextual and psychosocial factors of handwashing behaviour (Seimetz, Boyayo, et al., 2016). Age (in Study 1 and Study 3) and gender (in Study 3) were the only contextual factors that remained significant predictors when the psychosocial variables were entered into the models. Age in years was a significant predictor for the intention to call the Ebola hotline in Study 1. It seems that younger people are more likely to use a service like the Ebola hotline than older people are. Age differences in EVD perceptions and knowledge have also been found in a study from New Zealand, where age, sex, and education were significant associated with the number of

protective behaviours and a higher willingness to vaccinate (Petrie et al., 2016; van de Mortel, Bourke, McLoughlin, Nonu, & Reis, 2001).

The contextual factors relevant to handwashing habit in Study 3 were age and gender. It was found that older respondents tended to have a stronger handwashing habit than younger respondents. Women also tended to have a stronger handwashing habit than men, which might relate to the fact that women in Guinea-Bissau are more often responsible for childcare and the preparation of food than men, and that they therefore perform handwashing more often than men do. No studies have yet investigated domestic handwashing behaviour and gender in developing countries. Most studies about the determinants of handwashing behaviour are done in developed countries and mainly with health care workers. Likewise, many studies have explored factors steering handwashing among health care workers (e.g. Abdella et al., 2014; Whitby et al., 2006; Whitby et al., 2007). Few studies have investigated the determinants of nonprofessional handwashing (Aunger et al., 2010; Contzen & Mosler, 2015; Curtis et al., 2011; Seimetz, Boyayo, et al., 2016; Seimetz, Kumar, et al., 2016), and most of these studies have been done with primary caregivers as target audience (Vujcic et al., 2015). In most cases, the primary caregivers are women, since they are responsible for childcare and preparing food and thus have the highest chance of spreading diarrheal disease to the family, but other studies have been done with schoolchildren (Seimetz et al., 2017). In one study among health care workers about handwashing and gender, differences in handwashing rates between male and female health care workers were found. Female health care workers washed their hands more often than males did (van de Mortel et al., 2001). These inter-gender differences were also evident in studies with schoolchildren and adults in public restrooms, which showed that women washed their hands more frequently than did men after using toilet facilities (Day, Arnaud, & Monsma, 1993; Guinan, McGuckin-Guinan, & Sevareid, 1997). That handwashing is also crucial for boys and men (Vujcic et al., 2015) should be integrated into handwashing promotions by tailoring interventions to specifically target men, particularly if the promotion is to prevent a contagious disease such as EVD.

Of the six included contextual factors in the analysis in Study 1, and the three in Study 3, one contextual factor, age, showed a significant predictive power for calling the Ebola hotline and two, age and gender, for handwashing habit. Further research is needed to examine factors of the physical environment may influence handwashing, such as having a designated place for handwashing or the distance from the water source. A study using the RANAS approach for handwashing in Burundi found the quantity of water available per person per day to be the

only relevant contextual factor associated with handwashing behaviour (Seimetz, Boyayo, et al., 2016).

2.1.2 Psychosocial determinants of Ebola prevention instructions

The psychosocial factors that were most related to the EVD prevention behaviours were similar across all three studies. The key factors associated with EVD prevention behaviours were risk factors, comprising an individual's understanding and awareness of a health risk, response beliefs, meaning the belief that the behaviour will lead to the desired outcome, norm factors, comprising the perception of what others do and the approval or disapproval of significant others, and self-efficacy, a person's perceived ability to perform the behaviour and feeling committed to performing the behaviour. These findings are in line with previous research on EVD prevention behaviours (Featherstone, 2015; Kelly et al., 2015) and on handwashing behaviour (Aunger et al., 2010; Contzen & Mosler, 2015; Curtis et al., 2009; Devine et al., 2012; Seimetz, Boyayo, et al., 2016). All factor blocks of the RANAS model (Mosler, 2012) are represented in the revealed key predictors. For handwashing, it has been found that fear of cholera was a strong predictor during cholera epidemics (Curtis et al., 2009). Risk factors emerged as strong predictors for EVD prevention behaviours in the empirical studies of this thesis, nevertheless, other factors, such as response beliefs, social norms, self-efficacy and commitment, could explain EVD prevention behaviours beyond risk factors. In the following, the main findings for psychosocial factors associated with EVD prevention behaviours are discussed.

Risk factors associated with Ebola prevention behaviours

Many health practitioners share the common belief that people need to be taught about their health risks and made aware of the severe consequences of their unhealthy behaviours. Then, it is assumed, they will change their behaviour and start performing health behaviours such as doing more sport, eating more healthily, washing their hands at key times, or treating their drinking water. In reality, it has been shown that this is not the case (Contzen & Mosler, 2015; Kraemer & Mosler, 2010; Luszczynska & Schwarzer, 2003). Nevertheless, in outbreak situations, risk factors have been found to be related to prevention behaviours such as handwashing.

In all three studies, at least one factor from the risk factor block of the RANAS model was found to be related to the EVD prevention behaviours. Two risk factors, perceived severity and factual knowledge, were significant predictors (Study 1) for the intention to call the Ebola hotline and reporting a suspected EVD case, The intention not to touch someone who might be suffering from EVD was significantly associated with perceived severity, factual knowledge, and risk perception with regard to touching a person who might be suffering from EVD (risk touching). Risk perception, meaning thinking that the probability of an infection with EVD is high if one does not protect themselves with regular handwashing (Conditional vulnerability), emerged as a strong predictor of handwashing behaviour (Study 2). Three risk factors, perceived vulnerability, perceived severity, and factual knowledge, were relevant to handwashing habit (Study 3).

In Study 3, perceived vulnerability was negatively related to handwashing habit, which is in line with previous research on handwashing behaviour in developing countries (Contzen & Mosler, 2015; Devine et al., 2012) and on other health behaviours, such as exercising and cancer screening (Norman et al., 2005). Reverse causality might be the reason for this effect: people who protect themselves by washing hands - that is take precautions - often feel less vulnerable to contracting diseases such as diarrhea and EVD. A KAP survey from Liberia revealed also negative associations between risk perception and behaviours: People with a low risk perception reported more disinfectant handwashing and more often that they avoided physical contact with a person that might be suffering from EVD than those that had higher risk perceptions (The Liberia Ministry of Health, 2015). Performing preventive practices lowers thus respondents' risk perceptions. Some studies found positive relations of factual knowledge with handwashing, and some did not reveal any associations with handwashing (e.g. Biran et al., 2009; Devine et al., 2012; Seimetz, Boyayo, et al., 2016). Contzen and Mosler (2015) found in their handwashing studies in Haiti and Ethiopia inconsistent results for risk factors; both studies formed parts of emergency responses.

In the case of cholera epidemics, the perception of threat has been found to be related to prevention behaviour performance, such as handwashing (Aunger et al., 2010; Curtis et al., 2009). Factual knowledge, which is seen as a precondition for change in Bandura's social cognitive theory (1986), is highly relevant when a disease that has so far been unknown arises in a region. Nevertheless, various studies have found that factual knowledge is secondary to other factors (Biran et al., 2009; Contzen & Inauen, 2015; Hoque et al., 1996). A multi-country study using the RANAS model of behaviour change has provided quantitative evi-

dence about the psychosocial determinants of handwashing. It found that perceived severity was a significant predictor in five of the nine studies it included but factual knowledge in just three of the nine (Mosler, 2017).

Attitude factors associated with Ebola prevention behaviours: response beliefs and cost beliefs

Response belief is the belief that a behaviour will lead to the desired outcome; in the case of an outbreak, this is the perceived certainty that a behaviour will prevent the disease. This factor was consistently among the strongest predictors over all the EVD prevention behaviours investigated in the studies of this thesis. Allen and colleagues (2015) investigated the issue of home deaths and delayed health care seeking in 2014 in Liberia during the EVD outbreak. In line with the results of this thesis, they found that response belief, meaning being concerned about the quality of care in treatment centres, was key. In Haiti, response belief was shown to be a predictor of stool-related handwashing (Contzen & Mosler, 2013). Response beliefs go far beyond outcome expectations such as that handwashing or not touching a person who might be suffering from EVD prevents contracting EVD. They include belief and trust in the public health infrastructure and the capacity of the health system to handle the epidemic. This is key to avoiding further transmissions of EVD or any other contagious disease, because if there is no trust in the health services, people will avoid going to the health facilities, which enables the virus to spread. Confidence in the ability of the government to control infectious diseases has also been found to be important in a study by Kelly and colleagues (2015) about perceptions and plans for the prevention of EVD in US during the outbreak in West Africa.

Beliefs about costs were also predictors of handwashing behaviour (Study 2), as were beliefs about costs and time of handwashing habit (Study 3). In Mosler's (2017) multi-country study, affective beliefs were among the factors most often associated with handwashing, and instrumental beliefs about costs and benefits were related to handwashing in half of the cases.

Norm factors associated with Ebola prevention behaviours: descriptive and injunctive norms

Norm factors were among the strongest predictors for calling the Ebola hotline to report a suspected EVD case, for handwashing behaviour, and for handwashing habit. Various studies

have found that the perception of what others are doing, the perceived approval of important others in the social environment, and the belief of what should personally be done are all strongly and consistently associated with handwashing behaviour (Aunger et al., 2010; Contzen & Mosler, 2015; Curtis et al., 2009; Devine et al., 2012; Seimetz, Boyayo, et al., 2016). Descriptive and injunctive norms were also among the factors most often associated with handwashing in a multi-country study (Mosler, 2017). No norm factors were measured for the intention not to touch someone who might be suffering from EVD.

Ability factors associated with Ebola prevention behaviours: self-efficacy

Self-efficacy was a predictor for both behavioural intentions measured in Study 1. Handwashing habit (Study 3) was also associated with three factors of self-efficacy: a person's perceived ability to wash hands when required, a person's perceived confidence in having soap available, and a person's perceived confidence in being able to wash hands even if the next handwashing facility is quite distant. In health behaviour theory, self-efficacy is a key factor steering health behaviour (Bandura, 1986; Schwarzer, 2008). In Mosler's (2017) multi-country study about psychosocial determinants of handwashing, self-efficacy was relevant in five out of nine studies.

Self-regulation factors associated with Ebola prevention behaviours: commitment

Commitment, meaning that the person feels committed to perform the behaviour and that this is important for the person, was a strong predictor for the intention to call the Ebola hotline in Study 1 and Study 2, and for the intention not to touch a suspected EVD case in Study 2. Commitment strength has been found to be an important predictor for various WASH behaviours in developing countries (Contzen & Mosler, 2015; Huber & Mosler, 2013; Inauen et al., 2013a; Sonego & Mosler, 2014). Two items for commitment strength were included in Study 2: Commitment to touch and commitment not to touch someone who might be suffering from EVD. Both of the commitment items were found to be predictors of the intention not to touch someone who might be suffering from EVD, while analysis showed that 60 respondents, 12%, of the study participants, felt simultaneously committed to not touching and to touching someone who might be suffering from EVD. This ambivalence might be the result of cultural or religious factors. A statement from a West African conference participant at the Social and Behaviour Change Communication Summit in Addis Ababa, 2016, supports this assumption:

"In our culture, you cannot let go someone to the other world without taking care of him, or loving him". However, such ambivalence might be important for preventing the transmission of contagious diseases and should therefore be included in interventions. In the multi-country study about handwashing determinants, commitment was a significant predictor in three out of nine studies (Mosler, 2017).

Based on the findings about contextual factors, it is recommended that health programmes should focus on psychosocial factors and not on contextual factors. In line with the theory of triadic influence (Flay et al., 2009), the contextual factors seemed to be more causally distal to the behaviour and showed only indirect effects, which were mediated through psychosocial factors that were causally more proximal to behaviour.

Impact of promotional activities on Ebola prevention behaviours

Study 2 aimed to identify the psychosocial factors through which promotional activities addressed EVD prevention behaviours and to reveal which interventions were significantly associated with the target behaviours. A cross-sectional correlative study design was used to evaluate four EVD promotions that several local NGO had implemented as part of their EVD response in the Gambia 2015. The promotions were designed mainly to form knowledge about EVD and prevention behaviours, such as handwashing and calling the Ebola hotline. Regression analysis identified the key predictors for handwashing and calling the Ebola hotline, and these predictors were then included as potential mediators.

Identifying which of these predictors had not been tackled so far provided information that could be used to improve the promotions. Therefore, the psychosocial factors explaining handwashing were tested as mediators: conditional vulnerability, cost and response belief, descriptive, injunctive and personal norm, and for calling the Ebola hotline, the explaining psychosocial factors response belief, descriptive norm, commitment and communication. Three of the four promotions evaluated were significantly positively associated with handwashing behaviour: home visit, poster, and info sheet. The hygiene kit, which contained only material for handwashing, was not associated with any of the key psychosocial factors, and also not with handwashing behaviour. That infrastructure alone will not lead to the target health behaviour has been emphasized by several authors (e.g. Cairncross & Shordt, 2004; Mosler, 2012; Sonego et al., 2013). Except cost belief, all the psychosocial factors included, namely conditional vulnerability, response belief, descriptive, injunctive, and personal norm,

mediated the promotions' association with handwashing. This is an unexpected result, as the content of the promotional activities was mainly to enhance factual knowledge about EVD, so it might be expected that conditional vulnerability and response belief would be mediators of the promotions with handwashing. A possible interpretation of this finding is that the promotions were unintentionally related to the mediators, even though their content did not directly tackle them. That cost belief did not emerge as a mediator could be explained by the fact that no BCT addressed this factor, nor did an unintended effect arise that tackled this factor. The descriptive, injunctive, and personal norms that emerged as mediators might have been targeted unintentionally by the promotor making the home visit; this was found to be the promotion with the strongest relation to handwashing behaviour. The descriptive and injunctive norms at least would have been tackled when a respected and trusted community health worker visited a house and discussed EVD and prevention behaviours with several families living together. The posters, which were displayed in public places, might also have tackled the social norms when people read them and discuss their message in public.

One of the three promotions evaluated was significantly, but negatively associated with the intention to call the Ebola hotline: home visit. Poster and info sheet were not significantly associated with the intention to call the Ebola hotline. The promotional activities were significantly related to all the key psychosocial factors. While none of the activities was directly associated with the intention to call the Ebola hotline, all included psychosocial factors mediated the promotions' association with the intention to call the Ebola hotline. Again, this is an unexpected finding, because the information on the content of the promotions might have suggested that mainly response belief and communication would mediate the promotions' association with the intention to call the Ebola hotline. That the factor communication mediated the promotions' association with the intention to call the Ebola hotline, is not surprising, as at least the poster in public places and the home visit might lead to discussions about the content of the promotion and thus also about the Ebola hotline. The promotions might have unintentionally targeted others' behaviour and commitment. Home visit seemed to tackle also others' behaviour and commitment, what might be related to the performance of the promotor and the setting of the home visit. For the poster, it might be that people who read it, already had a higher commitment to perform EVD prevention behaviours than people who did not read the poster.

2.2 Implications for practice

The knowledge gained from the three studies presented in this dissertation contributes to the design and development of effective disease response interventions. The studies show that EVD prevention behaviours are the consequences of numerous psychosocial factors: risk factors, response beliefs, cost beliefs, norm factors, self-efficacy and commitment in explaining and predicting EVD prevention behaviours.

Promotions of disease prevention behaviours should therefore focus on these psychosocial factors, as they were revealed to be crucial for the intentions to perform prevention behaviours and for handwashing behaviour. Detailed descriptions of how the key psychosocial determinants can be linked with corresponding BCTs and combined with appropriate communication channels are provided in the empirical studies. In line with several researchers (e.g. Aboud & Singla, 2012; Vujcic et al., 2015), the studies show that it is crucial to take into account the specific local context. One salient finding is that people would continue to touch someone even if he or she showed symptoms of EVD, because they fear that others would think the respondent a bad or unhelpful person if he or she did not touch a person who might be suffering from EVD; this single finding might be key to the success of a health campaign and thus to the prevention of this disease. The studies identify critical barriers to effective prevention behaviour in an outbreak of EVD and need to be taken into account when designing a contextually appropriate EVD campaign.

There may be potential to extend the effective application of the RANAS model in emergency and outbreak situations. The RANAS model considers a wide range of factors that may be relevant for a behaviour, but it does not differentiate between factors that may be relevant in the first phase of a behaviour uptake and those potentially relevant for behavioural performance in another, more stable setting. Therefore, I suggest that the number of psychosocial factors considered might be reduced in the first phases of an emergency or an outbreak. The studies in this thesis and other studies too found risk factors, response beliefs, norm factors, self-efficacy, and commitment to be highly relevant for disease prevention behaviours (Aunger et al., 2010; Contzen & Mosler, 2015; Curtis et al., 2009; Devine et al., 2012; Featherstone, 2015; Kelly et al., 2015; Seimetz, Boyayo, et al., 2016). Additionally, and in line with the findings for injunctive norm in this thesis as strong predictor for EVD prevention behaviours, the role of faith and religious leaders during the previous EVD outbreak (Featherstone, 2015) has been emphasized. Their potential to convince people and so to change risky behav-

iours should be considered when implementing a campaign. This might be particularly important when standard information campaigns are implemented, especially when a disease arises in an area for the first time. To identify barriers to behaviour performance, close collaboration with a local partner organization is always required to identify additional context-specific items to add to the psychosocial factors from the RANAS model. The next section discusses the strengths and limitations of this thesis.

2.3 Strengths and limitations

To my knowledge, the studies of this thesis are the first comprehensive, quantitative, and strongly theory-based studies to explore and analyse the psychosocial determinants of disease-preventing intentions and behaviours in developing countries across several populations in two countries. The findings complement previous studies on EVD prevention, which have often included numerous contextual factors and some psychosocial factors but have never tested the complete range of factors specified in relevant theories. Only consideration of the complete range of factors enables conclusions to be drawn about the relative relation of psychosocial determinants to disease prevention behaviour. The studies of this thesis add evidence from a theory-based approach to understanding which contextual and psychosocial factors are associated with EVD prevention behaviours, and this may help to improve the effectiveness of future disease prevention interventions during outbreaks. The relation of contextual and psychosocial factors is clarified by examining how they each are associated with prevention behaviours.

The intention not to touch someone who might be suffering from EVD has not been studied in the same comprehensive way as the two other behaviours. Only a few factors were measured for the intention not to touch someone who might be suffering from EVD because this behaviour is a behaviour that should not be performed. To avoid an unintentional promotion this behaviour during the study interviews, discussion of it was kept short.

To my knowledge, Study 2 of this thesis is the first evaluation of EVD prevention activities in an outbreak response that also analysed the underlying processes. The assessment of the mode of operation of interventions implemented previously by local organizations is another strength of this thesis and something that is seldom accomplished. Understanding the processes underlying behaviour change interventions can improve their design and therefore their effectiveness.

In addition, considering several prevention behaviours and testing the contextual and the psychosocial determinants in two different populations are important contributions towards the development of theory about outbreak situations and allows both a broader understanding of the determinants that are related to behaviour and an appraisal of the findings' generalizability; however, this appraisal can only be done for outbreak contexts. Another strength of all the studies in this thesis is that they covered either the entire country or large areas of the country. The results of the empirical studies are not only shared with the research community. From the beginning of the projects, results were shared with local partners and stakeholders, and they had the opportunity to use the data and findings to improve their working processes. Besides these strengths, some limitations need to be considered. In Study 1 and Study 2 of this dissertation, behavioural intention was used as outcome variable for reporting a suspected case to the Ebola hotline and not touching someone who might be suffering from EVD because there were no cases of EVD in the study countries. However, it would be difficult to directly intervene on intention. It has been shown that intention formation can lead to inhibitory processes that help to prevent our habits from taking over, so intentions may be effective for changing habits. In particular, implementation intentions may be effective for successfully breaking unwanted habits, especially when the habit is not too strong (Danner, Aarts, Papies, & de Vries, 2011).

Studies in emergencies and outbreak suffer from certain shortcomings, mainly due to time pressure and many uncertainties in the affected areas, and these affect all stages of a research project. Issues of study design, samples, and data measures are addressed in the following.

2.3.1 Study designs and sample sizes

The evidence reported in this thesis is based on cross-sectional data and correlations between contextual, psychosocial factors and EVD prevention behaviours. Therefore, no conclusions can be drawn on causalities between the determinants and EVD prevention behaviours. Confirming the associations of the contextual and psychosocial determinants with the EVD prevention behaviours would require a follow-up. Nonetheless, the findings have been confirmed by previous studies in similar settings (Curtis et al., 2009; Mosler, 2017).

Ethical and time constraints meant that no control group existed in Study 2 for the evaluation of EVD prevention interventions. The local collaborator and other local partners applied several promotional activities without differentiating between intervention groups. Therefore,

some of the respondents might have experienced several promotional activities or various combinations of activities. No account was taken of the fact that some combinations might have different effects on behaviour than others. Again, no conclusions can be drawn about causality between the promotional activities and behaviours, as it applied a cross-sectional design. It might also be that respondents with a high behaviour frequency were more likely to read and remember the content of the promotion tools. In future studies, interaction effects should be taken into account. Further, consideration should be given to the attitudes of the respondents towards the various promotional channels and activities and attributes of promotions such as frequency, liking, convincingness, and trustworthiness. Intervention evaluation studies should apply an experimental pre-post design to assess behaviours and the effects of interventions on behaviours. The samples from Study 1 and Study 3 were quite large, which can lead to negligible associations; this means that small associations may reach significance. To overcome this, associations could have been tested with a *p*-value of .01 instead of .05.

2.3.2 Measures

Most of the constructs measured for the studies of this thesis were operationalized with established items derived from the literature. The items used in the three studies have been used in various other studies on water (e.g. Huber & Mosler, 2013; Inauen & Mosler, 2014; Lilje et al., 2015; Stocker & Mosler, 2015), sanitation (e.g. Sonego & Mosler, 2014; Tumwebaze et al., 2014), and handwashing behaviour (e.g. Contzen & Mosler, 2015; Seimetz, Boyayo, et al., 2016). Nevertheless, this was the first time these items were used in the local contexts of Guinea-Bissau and the Gambia. The survey tools were not validated or tested for reliability. Focus group discussions were used to collect information to adapt the questionnaire to the specific local context. The questionnaire for the surveys in Guinea-Bissau was prepared in Portuguese, the one for the Gambia in English. Key words in the questions were translated into the local languages, but this was the first time the items were used in the local languages of Guinea-Bissau, Creole and Bijago, and of the Gambia, Jola, Mandinka, and Fula. Due to the outbreak setting, time constraints did not allow a complete translation and retranslation of the questionnaire. However, the translation of the questions was intensively discussed and trained in the interviewers' training prior to data collection and with professional translators. The applicability of the questionnaires was verified by a pre-test at the end of the interviewers' training. The results from the pre-test were integrated in the final version of the questionnaire, and items were adjusted as necessary.

A further issue is that only self-report measures have been applied; this practice has been criticized by several scholars due to the risk of social desirability and recall biases (e.g. Biran et al., 2008; Brener, Billy, & Grady, 2003; Pavani Ram, 2013). This limitation is more relevant for the handwashing behaviour in this thesis, as only the intention to call the Ebola hotline and to not touching someone who might be suffering from EVD could be measured. Nevertheless, the accuracy of the self-reports may have been affected by the high awareness of EVD during the time of the outbreak, the number of education campaigns implemented, and the sensitivity of the topics of reporting a sick person to a hotline and not touching a suspected EVD case, which was often understood as not helping the affected person. Objective measurements of handwashing behaviour may be gathered by direct behavioural observations (e.g. Biran et al., 2008; Halder et al., 2010). However, feasibility and time issues obliged data for the studies to be collected by means of self-report. Therefore, an over-reporting bias for at least the frequency of handwashing is very likely. Nevertheless, our goal was to assess the relative impacts of the various contextual and psychosocial factors on EVD prevention behaviours and not to report absolute behaviour rates. In future studies, it would be appropriate to include other measures as proxies (e.g. Ruel & Arimond, 2002), such as having a designated location to wash hands, which is a proxy for handwashing behaviour (Devine et al., 2012). Another limitation is that Study 3 about handwashing habit is not in line with the principle of compatibility (Ajzen & Fishbein, 2000), meaning that only habit-specific psychosocial factors can predict handwashing habit.

2.4 General conclusions

A growing understanding of what drives WASH and other prevention behaviours is providing new approaches to changing behaviours. Identifying and addressing the psychosocial determinants of disease prevention behaviours are crucial first steps in developing effective health interventions. The assumption of the social-cognitive approach is that behaviours are caused by people's cognitions, which can be modified when tackled in an appropriate way. However, theory-based interventions and evaluations of the effectiveness of interventions in developing countries are still rare, particularly in populations affected by humanitarian emergencies and outbreaks. This is a core data gap that needs to be closed to develop effective behaviour change interventions in such contexts. We also need to understand how best to make prevention behaviours matters of daily routine that are sustained on a mass scale. This thesis consti-

tutes the first comprehensive, theory-based study of this kind of EVD prevention behaviours during an EVD outbreak, and it contributes to the evidence base on the contextual and psychosocial factors underlying disease-preventing behaviours during an outbreak.

In two different samples, one in Guinea-Bissau and one in the Gambia, psychosocial factors successfully explained several EVD prevention behaviours. Even if a threat such as EVD is associated with people's risk perceptions, various other factors are also key. Strong evidence has been found that EVD prevention behaviours are explained by risk factors, comprising an individual's understanding and awareness of a health risk, response beliefs, meaning the belief that the behaviour will prevent an individual from getting EVD, by norm factors, comprising the perception of what others do and the approval or disapproval of significant others, by self-efficacy, the confidence in one's ability to perform the behaviour and by feeling committed to performing the behaviour.

This means that these determinants should be taken into account when designing behaviour change strategies in outbreak situations. Further, it is also recommended that health programmes focus on psychosocial factors and not on contextual factors, as the contextual factors seemed to be more causally distal to the behaviour and showed only indirect effects. Additionally, even when a comprehensive model such as the RANAS model is used to investigate underlying key factors of behaviours, it remains crucial to integrate other, context-dependent measures, which can only be elaborated in close collaboration with local partners. Two such other measures were found in this thesis to be key to preventing the transmission of contagious diseases. Firstly, a subgroup of respondents felt simultaneously committed to not touching and to touching someone who might be suffering from EVD, which might be explained by ambivalence due to cultural or religious factors. Secondly, numerous people stated they would continue to touch someone even if he or she showed symptoms of EVD, because they feared that others would think them bad or unhelpful people if they did not touch a person who might be suffering from EVD. Besides the predictors of prevention behaviours identified in this thesis, these findings need to be taken into account when designing effective campaigns.

Another issue is that an environment needs to be created beyond the individual or the household level in which people feel able to perform prevention behaviours. This is represented by response belief, which has emerged as among the most important factors in explaining prevention behaviours. Response belief starts with individual behaviour but goes far beyond the individual level to belief and trust in the public health infrastructure and the capacity of the health system to handle an epidemic.

Further, of the activities and channels applied in standard EVD prevention promotions in the Gambia, three of the four evaluated promotions were positively associated with EVD prevention behaviours, while the distributed material for handwashing was not associated with behaviour.

The comparison of several disease prevention behaviours provides a rare opportunity for testing the generalizability of the RANAS model in outbreak situations. As the determinants are similar across the behaviours and countries, the findings constitute a foundation for selecting key determinants to address behaviours in future outbreak situations in developing countries.

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Appendix

Appendix I: Supplementary Material Chapter II and IV

Questionnaire used in Guinea-Bissau (Portuguese version)

Prevenção do Ébola: Riscos, Atitudes, Normas, Habilidades, e Auto-Regulação, Guiné-Bissau

Questionário: Entrevistas estruturadas Julho 2015

Verificado: □ Sim

Para os entrevistadores:

- Comece no local acordado e tente entrevistar usando um intervalo de dois agregados.
- Por favor, si no caso a pessoa a entrevistar é uma mulher é necessario a encontrar a pessoa do agregado familiar que é responsável pelo cuidado dos doentes!!!
- Por favor, antes de você iniciar a entrevista com uma família, anote o número de agregados familiares que não quiseram ser entrevistados.

A1 Número de famílias que não quiseram ser entrevistadas: _____

Por favor, apresente-se!

Olá, o meu nome é _____ e estou a trabalhar para a EAWAG, o Instituto Suíço de Pesquisa da Água, em colaboração com UNICEF e NADEL.

<u>Si no caso a pessoa a entrevistar é uma mulher, diga:</u> Eu gostaria de falar com a pessoa que é o responsável pelo cuidados de saúde dos membros deste agregado familiar.

Se você não se importa, eu gostaria de entrevistá-lo (a) sobre as práticas de higiene comportamentos de prevenção de Ébola. Vai durar aproximadamente uma hora. Você tem tempo para esta entrevista? Você pode continuar a fazer o seu trabalho enquanto conversamos, que não nos perturba. Também estamos a entrevistar outras famílias na sua comunidade. Os resultados serão tratados de forma anónima (ninguém saberá que fez esta entrevista).

Gostaríamos de saber sobre as suas práticas de higiene diária, para que possamos melhorar a situação de higiene e da resposta do Ébola dependendo da informação que nos possa fornecer. Você pode ajudar-nos a melhorar se você responder da forma mais honesta e com a maior precisão possível.

A participação neste estudo é voluntária. Você não tem de participar, se você não quiser. Você não tem que responder a nenhuma pergunta que você não queira ou não saiba responder.
Ao assinar este formulário de consentimento, você está concordando em participar da entrevista.

Assinatura do participante/impressão digital:.....

A3 A pessoa deu o seu consentimento oral? [1]□ sim [0]□ não ➔ **dizer obrigado e adeus!**

⇨ **Se SIM: por favor começar com a entrevista**

B105: Hora do Início: _____

INFORMAÇÕES GERAIS SOBRE A ENTREVISTA (INQUIRIDORES)

B100: Número de identificação da família (O inquiridor não deve preencher): _____
B101: Data da entrevista: _____/_____/_____
B102: Nome do entrevistador: _____
B103: Nome da região:

1	Tombali	6	Bafatá
2	Quinara	7	Gabú
3	Oio	8	Cacheu
4	Biombo	9	Bissau (SAB)
5	B/Bijagos		

B104: Nome da Comunidade/Tabanca: _____

Prevenção do Ébola: Riscos, Atitudes, Normas, Habilidades, e Auto-Regulação – Questionário

DADOS DA PESSOA A ENTREVISTAR

B106: Nome do entrevistado (=no caso a pessoa a entrevistar é uma mulher: nomes da pessoa que presta cuidados de saúde aos doentes dentro da familia (Todos os nomes!):_____

B107: Nome do responsável pelo agregado (Todos os nomes!): _____

B108: Número de telemóvel do entrevistado: _____ □[999] Recusado/ não tem

B109: Sexo do entrevistado: [1]□ Feminino [0]□ Masculino

B110: Idade: _____ [999]□ Recusado/ não sabe

Entrevistador: **De B111 para B116 Pergunte lendo as opções e marque de acordo com a afirmação! (1 resposta!)**

B111: Estado civil

1	2	3	4	5
Casado	Solteiro	Viúvo	Divorciado/ separado	Coabitação

B112: Você é capaz de ler ou escrever?

1	2	3
Não sabe ler nem escrever	Só sabe ler	Sabe ler e escrever

B113: Educação

1	Escola primária	**3**	Liceu	**5**	Escola Corânica	**7**	Outra:
2	Escola Secundária	**4**	Universidade	**6**	Não tem		

B114: Religião

1	Muçulmano	**4**	Crenças tradicionais
2	Cristão	**5**	Não tem
3	Protestante	**6**	Outra:

B115: Etnia

1	Bijagó	**3**	Mandinga	**5**	Nalu	**7**	Felupe	**9**	Manjaco	**11**	Sosso
2	Fula	**4**	Balanta	**6**	Beafada	**8**	Mancanha	**10**	Pepel	**12**	Outra:

B116: Principal fonte de sustento do Agregado

1	Agricultura	**3**	Comércio	**5**	Emprego informal	**7**	Outras:
2	Trabalhador Diário	**4**	Emprego formal	**6**	Outro trabalho independente		

B500: Número de pessoas residentes no domicílio (TOTAL) (incluindo crianças.): _____

B501: Número de crianças menor de 5 anos residentes no domicílio: _____

CONHECIMENTO SOBRE ÉBOLA

Por favor, informe o entrevistado!! A seguir, vamos começar a falar sobre Ébola e problemas de saúde.

B900: **(Aberto!)** Você pode-me dizer qual a origem do Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Morcegos infetados, macacos ou porcos de mato infetados.	**6**	É a vontade de Deus.
2	Depois de cometer um pecado	**7**	Ele vai se espalhar de forma espontânea.
3	Por Feitiçaria	**8**	Eu não me lembro/Eu não sei
4	Guiné Conakri	**9**	Sujidade/falta de higiene
5	É um Vírus	**10**	Outros:

B901: **(Aberto!)** Como você pode ser infetado pelo Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Contato com morcegos, frutas infetadas, macacos ou porcos de mato	**13**	Através do contato direto com vómito de pessoas infetadas.
2	O consumo de carne crua de morcegos infetados ou macacos ou javalis/consumo de porco de mato	**14**	Cerimónias fúnebres em que os enlutados têm contato direto (lavagem, tocar) com o corpo de uma pessoa falecida de Ébola
3	Contacto direto ou próximo com pessoas com sintomas do Ébola/Contacto com pessoa suspeita	**15**	Através do contato direto com o suor de pessoas infetadas.
4	Tocar diretamente no suor de pessoas infetadas.	**16**	Através de sémen de pessoas infetadas.
5	Não usar casa de banho	**17**	Através do ar
6	Por sujidade	**18**	Por Feitiçaria
7	Por água suja	**19**	Através de fluido vaginal de pessoas infetadas.
8	Por você não lavar as mãos quando devia lavá-las	**20**	Se você vai a um centro de saúde/hospitalar
9	Por você não estar limpo/por falta de higiene	**21**	Por vontade de Deus
10	Através do contato direto com a saliva de pessoas infetadas.	**22**	Através do contato direto com o sangue de pessoas infetadas
11	Através do leite materno de uma mulher infetada	**23**	Eu não me lembro/não sei
12	Através do contacto direto com as fezes de pessoas infetadas	**24**	Outros:

Inquiridor: **Durante o inquérito, diga aos presentes para não ajudar. Por favor, agora responda as questões utilizando SIM, NÃO ou NÃO SEI.**

B902: Homens que já se recuperaram da doença do Ébola podem transmitir o vírus através do seu sémen no período de até 90 dias após a recuperação da doença?

[1]□ sim [0]□ não [9]□ não sei

B902a Preparação ou consumo de carne de mato (definição: morcegos infetados ou macacos/ ou porco de mato) pode ser um modo de contrair/apanhar o Ébola?

[1]□ sim [0]□ não [9]□ não sei

B904: O Ébola propaga-se através do ar? [1]□ sim [0]□ não [9]□ não sei

B905: É possível recuperar-se de Ébola? [1]□ sim [0]□ não [9]□ não sei

B906: O tempo do primeiro contacto com o vírus da Ébola (ex.: morcegos, sangue ou suor da pessoa infetada) até o aparecimento dos primeiros sintoma (=efeito no seu corpo) é de 2 a 21 dias? [1]□ sim [0]□ não [9]□ não sei

B907*:* As pessoas podem contagiar outras pessoas imediatamente após serem infetados pelo Ébola?

[1]□ sim [0]□ não [9]□ não sei

B908: É fácil distinguir o Ébola de outras doenças infeciosas, como a malária, febre tifoide e meningite no início da doença?

[1]□ sim [0]□ não [9]□ não sei

B909 O contato direto com uma pessoa suspeita (=tem sintomas) pode ser um risco de transmissão de Ébola?

[1]□ sim [0]□ não [9]□ não sei

B910: Os corpos de pessoas que morreram por causa do Ébola são portadores do vírus?

[1]□sim [0]□ não [9]□não sei

B910a Cerimónias fúnebres em que os enlutados têm contato direto com o corpo da pessoa falecida, têm desempenhado um papel na transmissão do Ébola? [1]□ sim [0]□ não [9]□ não sei

B911: **(Aberto!)** Quais são os primeiros sintomas de Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Febre	**6**	Cansaço
2	Dor de músculos	**7**	Náuseas
3	Dor de cabeça	**8**	Eu não me lembro/não sei
4	Dor de garganta	**9**	Sangramento
5	Vómito (com ou sem sangue)	**10**	Diarreia (com ou sem sangue)
		11	Outros:

Inquiridor: **Por favor, agora responda as questões utilizando SIM, NÃO ou NÃO SEI.**

B912: Febre: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B913: A sede/secura: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B914: O cansaço: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B915: Perda de cabelo: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B916: Dores muscular: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B917: Dor de garganta: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B918: Unhas azuis: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B919: Dor de cabeça: pode ser um primeiro sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B919a Diarreia (com ou sem sangue): pode ser um sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B920: **(Aberto!)** Depois dos sinais e dos sintomas, diga o que acontece a seguir? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Você pode ficar muito doente.	**8**	Vómitos podem conter sangue
2	Vómitos	**9**	Diarreia pode conter sangue
3	Diarreia	**10**	Tosse pode conter sangue
4	Tosse	**11**	Forte dor de cabeça
5	Sangramento na maioria das vezes pelo nariz e boca	**12**	Eu não me lembro/não sei
6	Sangue nas fezes	**13**	Outros:
7	Erupção cutânea		

Inquiridor: Por favor agora responda com SIM, NÃO ou NÃO SEI outra vez.

B920a Sangramento (interno e externo), maioritariamente pelo nariz e boca: podem ser sintomas do Ébola.?

[1]□ sim [0]□ não [9]□ não sei

B920b Erupção cutânea: é um sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B920c Vómitos (com ou sem sangue): pode ser um sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B920d Diarreia com sangue: pode ser um sintoma de Ébola? [1]□ sim [0]□ não [9]□ não sei

B921: **(Aberto!)** Você pode-me dizer como se pode evitar o Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Evitar o contacto direto com pessoas infetadas e mortas pelo Ébola.	**9**	Não consumir carne de animais selvagens
2	Construção de casas de banho/latrinas	**10**	Proteger os alimentos
3	Beber/ter água limpa	**11**	Uma boa higiene e manutenção de um ambiente limpo.
4	Orar a Deus/Deus nos protege	**12**	Não é possível evitar o Ébola.
5	Lavar as mãos regularmente com água e sabão depois de visitar os doentes no hospital	**13**	Gerir o caso suspeito
6	Lavar as mãos regularmente com água e sabão em momentos-chave (antes de comer, após o contacto com fezes)	**14**	Eu não me lembro/Eu não sei
7	Evitar o contacto direto com os fluidos corporais de pessoas infetadas	**15**	Ligar a linha verde/nº de emergência.
8	Lavar as mãos regularmente com água e sabão depois de cuidar de pacientes em casa.	**16**	Outros:

Inquiridor: **Por favor, agora responda as questões utilizando SIM, NÃO ou NÃO SEI.**

Você pode-se proteger do Ébola com os seguintes comportamentos?

B922: Evitar o contacto direto (tocar) com pessoas infetadas e que faleceram devido ao Ébola?
[1]□ sim [0]□ não [9]□ não sei

B923: Lavar as mãos regularmente com água e sabão em momentos-chave (antes de comer, após o contacto com fezes)? [1]□ sim [0]□ não [9]□ não sei

B924: Ferver água para beber? [1]□ sim [0]□ não [9]□ não sei

B925: Evitar o contacto direto com os fluidos corporais (sangue, fezes, vómito, urina) de pessoas infetadas?
[1]□ sim [0]□ não [9]□ não sei

B926: Beber muita água limpa? [1]□ sim [0]□ não [9]□ não sei

B926a**:** Evitar consumir carne de mato? [1]□ sim [0]□ não [9]□ não sei

B927: **(Aberto!)** Pode-me dizer o que é que se deve fazer se você ou algum membro da sua família tiver sinais e sintomas do Ébola?

Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!

1	Levar a pessoa doente para um centro de tratamento	**5**	Mudar de casa
2	Comunicar através da linha verde e relatar o caso suspeito	**6**	Não sei
3	Cuidar dele	**7**	Não me lembro
4	Evitar de tocar	**8**	Outro:

MEDIDAS SUBSTITUTAS DE HIGIENE – 1

B150: **(Aberto!)** Como é que você lava as mãos normalmente?

Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!

1	2	3	4	5	6	7	8
Apenas água	Só cinza	Só areia	Água e Sabão	Água e cinza	Água e areia	Agua com lixivia	Outros:

B151: Você tem sabão? [1] sim [0] não

B152: Quanto dinheiro é que a sua família gasta por mês em sabão? _____ FCFA [-9] Não sei

B153: **(Aberto!)** Geralmente, que tipo de sabão é que você tem em casa? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	2	3	4	5	6	7
Normalmente, não tem sabão	Sabão líquido	Sabão em barra	Sabão de banho	Sabão em pó	Soda /sabão preto	Outros:

Conhecimento da ACÇÃO

B181: **(Aberto!)** Quais são os momentos críticos ou mais importantes para a lavagem das mãos com água e sabão? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Após defecação	**6**	Antes de beber
2	Depois de limpar um bebé	**7**	Depois de cuidar de uma pessoa doente
3	Antes de cozinhar/preparar comida	**8**	Depois de comer
4	Antes de dar de comer a uma criança	**9**	Depois de regressar a casa
5	Antes de comer	**10**	Outros:

INTENÇÕES DE COMPORTAMENTO

B1: Qual o nível de intenção com que você pretende lavar sempre as mãos com água e sabão antes de manusear alimentos (antes de comer, alimentar uma criança, preparar ou cozinhar alimentos)?

1	2	3	4	5
Nenhum	baixo	médio	Forte	Muito forte

B2: Qual o nível de intenção com que você pretende lavar sempre as mãos com água e sabão após o contacto com fezes (após a limpeza de um bebé, depois de defecar e depois de outro contacto com fezes)?

1	2	3	4	5
Nenhum	baixo	médio	Forte	Muito forte

B360: Qual o nível de intenção com que você pretende não tocar/evitar de tocar em uma pessoa doente que pode ter Ébola em sua casa?

1	2	3	4	5
Nenhum	baixo	médio	Forte	Muito forte

B400: Qual o nível de intenção com que você pretende ligar para a linha verde se você tem uma pessoa com suspeita de Ébola em sua casa?

1	2	3	4	5
Nenhum	baixo	médio	Forte	Muito forte

B400b Se você não tiveres a cobertura de rede na sua casa, como fortemente voce iria tentar de dislocar para outro lugar a fim de encontrar a rede, para ligares a linha verde se voce tem uma pessoa com suspeita de Ébola em sua casa?

1	2	3	4	5
De modo algum	Um pouco	Bastante	Fortemente	Muito fortemente

B400c Todas as coisas consideradas (por exemplo, sem rede, outras barreiras), qual é a probabilidade de que você realmente vai ligar para a linha verde se tem uma pessoa com suspeita de Ébola em sua casa?

1	2	3	4	5
Nada provável	Um pouco provável	Bastante provável	Provável	Muito provável

Comportamento por Vontade

Favor informe a pessoa que está a responder. Agora, gostamos de lhe pedir para se imaginarnuma determinada situação. Não estamos a dizer que vai estar nestas situações. No entanto, gostaríamos que pensasse como iria reagir se estivesse nestas situações.

Suponhamos que foi o dia inteiro para o mercado vender vegetais. No fim do dia, regressa a casa e encontra um membro da sua família a vomitar e o um vótimo com sangue, que pode ser um dos sintomas de Ébola. Nestas circunstâncias, o que é estaria disposto a fazer segundo cada uma das opções seguintes?

B44 Não tocar/evitar de numa pessoa doente, reduz assim o risco de apanhar o Ébola.

1	2	3	4	5
Não disposto	Pouco disposto	Bastante disposto	Disposto	Muito disposto

B45 Ligar para a linha verde e comunicar um caso de suspeito de Ébola na sua família.

1	2	3	4	5
Não disposto	*Pouco disposto*	*Bastante disposto*	Disposto	Muito disposto

MEDIDAS COMPORTAMENTAIS

B170: Em geral, você lava as mãos com água e sabão menos de 3 vezes por dia; 4-9 vezes ao dia; 10 ou mais de 10 vezes por dia?

[1] □ ⩽ 3 vezes por dia [2] □ 4-9 vezes ao dia [3] □ 10 ou mais vezes por dia

B4: Antes de comer, com que frequência você lava as mãos com água e sabão?

0	1	2	3	4	5
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

B5: Antes de amamentar a criança, com que frequência você lava as mãos com água e sabão?

0	1	2	3	4	5
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

B6: Antes de dar de comer a uma criança, com que frequência você lava as mãos com água e sabão?

0	1	2	3	4	5
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

B14: Você lava frequentemente as mãos com água e sabão?

1	2	3	4	5
Não frequentemente	Um pouco frequentemente	Meio frequentemente	Frequentemente	Muito frequentemente

B16 Você lava as suas mãos com água e sabão, sem pensar?

1	2	3	4	5
Não sem pensar	Um pouco sem pensar	Médio sem pensar	Sem pensar	Sem pensar em tudo

B17 Você lava as suas mãos automaticamente com água e sabão?

1	2	3	4	5
Não tudo automáticamente	Um pouco automáticamente	Automáticamente médio	Automáticamente	Muito automáticamente

B18 Acha que a lavagem das mãos com água e sabão é algo que você tem feito por um longo tempo?

1	2	3	4	5
Não a um longo tempo	Dificilmente há muito tempo	Médio longo tempo	Longo tempo	Muito longo tempo

B20 Sente estranho se você não lavar as mãos com água e sabão?

1	2	3	4	5
Nem um pouco estranho	Um pouco estranho	Médio estranho	Estranho	Muito estranho

B21 Começa a lavar as mãos com água e sabão antes de perceber de que você está fazendo isso?

1	2	3	4	5
Eu não concordo em tudo	Eu concordo um pouco	Eu concordo médio	Eu concordo	Eu concordo muito

FATORES DE RISCOS

Por favor, informe o entrevistado!! A seguir, vamos falar sobre os riscos de saúde em matéria de Ébola.

B123: Segundo a sua opinião, qual é o nivel de risco que você tem para apanhar o Ébola?

1	2	3	4	5
Não há risco	*Pouco Risco*	*Médio*	*Alto risco*	*Risco muito elevado*

B124: **(Aberto!)** Se ***"não há risco":*** por que é que acha que não há risco de apanhar o Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Na minha região não há Ébola	**7**	Deus me está protegendo/nós
2	Eu lavo sempre as mãos com água e sabão	**8**	Porque ninguém na família apanhou até agora
3	Eu não conheço ninguém que esteja a sofrer de Ébola	**9**	Por causa da higiene/limpeza
4	Por causa da prevenção/cuidado/bom comportamento	**10**	Não sei
5	Por seguirmos os conselhos/regras/o que eles disseram (promotor de NADEL, ADEMA, ADPP, CRMT)	**11**	Outros:
6	Eu nunca como carne de animais selvagens		

B125: **(Aberto!)** Se a resposta ***2-5*** em ***B123:*** Por que é que achas que existe um risco de apanhares o Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Porque é a vontade de Deus/decisão	**5**	Porque o menor descuido pode causar
2	Comer carne de animais selvagens	**6**	Eu não sei
3	Você pode obtê-lo, mesmo se você for cuidadoso/clara/precauções	**7**	Tenho contacto com pessoas de Guiné-Conacri
4	Habito na linho da fronteira/zona de risco	**8**	Outros:

B126: Segundo a sua opinião, qual é o nível de risco que tem alguém do seu agregado familiar de apanhar o Ébola?

1	2	3	4	5
Não há risco	Pouco risco	Médio risco	Alto risco	Risco muito elevado

B128: Qual é a probabilidade de contrair o Ébola se não se proteger lavando as mãos regularmente com água e sabão em momentos críticos?

1	2	3	4	5
Não é provável	Um pouco provável	Médio provável	Provável	Muito provável

B129: Qual é a probabilidade de contrair o Ébola se se proteger lavando as mãos regularmente com água e sabão em momentos críticos?

1	2	3	4	5
Não é provável	Um pouco provável	Médio provável	Provável	Muito provável

Imagine que você contraiu o Ébola, quão grave é o impacto para...

B130: ...a sua vida em geral?

1	2	3	4	5
Não é grave	Um pouco grave	Bastante grave	Grave	Muito grave

B7: Antes de cozinhar, cortar ou preparar alimentos, com que frequência você lava as mãos com água e sabão?

0	1	2	3	4	5
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

B9: Depois de defecar, com que frequência você lava as mãos com água e sabão?

0	1	2	3	4	5
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

COMUNICAÇÃO

B133: Quantas vezes fala sobre a lavagem das mãos com água e sabão, cinza ou areia e a saúde com os outros?

1	2	3	4	5
Nunca	*Raramente*	*Às vezes*	*Frequentemente*	*Muito frequentemente*

B134: Se ***2-5*** em ***B133*****:** Quando você fala sobre a lavagem das mãos com água e sabão, cinza ou areia e saúde, você fala positivamente ou negativamente sobre isso?

1	2	3	4	5
Nada positivamente	Pouco positivamente	Bastante positivamente	Positivamente	Muito positivamente

B135: Com que frequência você vai falar sobre a linha verde e ligar se tiver um caso suspeito de Ébola em sua casa?

1	2	3	4	5
Nunca	*Raramente*	*Às vezes*	*Frequentemente*	*Muito frequentemente*

B136: Se ***2-5*** para o **B135**: Quando você fala sobre a linha verde do Ébola , você fala positivamente ou negativamente sobre isso?

1	2	3	4	5
Nada positivamente	Pouco positivamente	Bastante positivamente	Positivamente	Muito positivamente

Prevenção do Ébola: Riscos, Atitudes, Normas, Habilidades, e Auto-Regulação – Questionário

A LAVAGEM DAS MÃOS COM AGUA E SABÃO

B145: Desde ontem a esta hora, você lavou as mãos com água e sabão? 1□ Sim 0□ Não

B147: **(Aberto!)** Em geral, por que você lava as mãos com água e sabão? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Contra bactérias (para evitar bactérias/germes/micróbios)	**7**	Contra a doença (para evitar a doença/doença/infeção)
2	Contra Ébola	**8**	Para proteger a saúde (para proteger a vida/todos)
3	Para proteger as nossas crianças/bebé (de Ébola)	**9**	Por causa da higiene
4	Contra sujidade/cheiro (por causa da sujidade/gordura/cheiro)	**10**	Comportamento do grupo (todo mundo faz isso)
5	submissão/obrigação (que me disse assim/Eu tenho que fazê-lo)	**11**	Depois de trabalho
		12	Não sei
6	Hábito (é o que eu estou acostumado a/o que eu sempre fiz/é um hábito)	**13**	Outros:

B171: Considerando a frequência com que lava as mãos, qual é o nível de risco de contrair o Ébola?

1	**2**	**3**	**4**	**5**
Não há risco	Pouco Risco	Médio	Alto risco	Risco muito elevado

B19 Quanto sente que lavar as mãos com água e sabão é como uma questão de hábito?

1	**2**	**3**	**4**	**5**
Nem um pouco de hábito	Um hábito fraco	Hábito	Hábito forte	Hábito muito forte

B10: Depois que você limpar o traseiro de uma criança, com que frequência você lava as mãos com água e sabão?

0	**1**	**2**	**3**	**4**	**5**
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

B11: Após outros tipos de contactos com fezes, com que frequência você lava as mãos com água e sabão?

0	**1**	**2**	**3**	**4**	**5**
Não é aplicavel	(Quase) em nenhum momento	Às vezes	Metade das vezes	Na maioria das vezes	(Quase) sempre

ATITUDES EM RELAÇÃO À LAVAGEM DAS MÃOS

B172: Qual é o esforço que acha que você faz para lavar as mãos sempre com água e sabão?

1	**2**	**3**	**4**	**5**
Nenhum esforço	Pouco esforço	Esforço médio	Esforço	Muito esforço

B173: Qual o tempo que você acha que gasta para lavar as mãos sempre com água e sabão?

1	**2**	**3**	**4**	**5**
Não demorada	Pouco demorada	Meio demorada	Demorada	Muito demorada

B174: Que certeza você tem em como lavar as mãos sempre com água e sabão, prevene a si e à sua família de apanhar doenças como a diarreia?

1	**2**	**3**	**4**	**5**
Não tenho certeza	Pouca certeza	Meia Certeza	Certeza	Muita certeza

B174a: Que certeza você tem em como lavar as mãos sempre com água e sabão, prevene a si e à sua família de apanhar doenças como o Ébola?

1	**2**	**3**	**4**	**5**
Não tenho certeza	Pouca certeza	Meia Certeza	Certeza	Muita certeza

B175: Você gosta de lavar as mãos com água e sabão?

1	2	3	4	5
Não gosto nada disso	Gosto pouco	Meio gosto	Gosto	Gosto muito

NORMAS SOBRE A LAVAGEM DAS MÃOS COM ÁGUA E SABÃO

Inquiridor: Por favor, explique para o participante do estudo: Nós estamos à procura da perceção do entrevistado, e não do seu conhecimento!!

B177: Quantas pessoas do seu agregado familiar lavam as mãos sempre com água e sabão?

1	2	3	4	5
(Quase) ninguém	Alguns deles	Metade deles	A maioria deles	(Quase) todos eles

B178: Quantas pessoas da sua Tabanca é que lavam as mãos sempre com água e sabão?

1	2	3	4	5
(Quase) ninguém	Alguns deles	Metade deles	A maioria deles	(Quase) todos eles

B179a Pessoas importantes para si como membros da sua familia, quanto delas aprovariam que laves sempre as suas mão com água e sabão?

1	2	3	4	5
Nem um pouco	Um pouco	Medio	Fortemente	Muito fortemente

B179b Pessoas que são importantes para si como seus amigos, quanto delas aprovariam que deves lavar as suas mãos com água e sabão?

1	2	3	4	5
Nem um pouco	Um pouco	Medio	Fortemente	Muito fortemente

B179c Pessoas importantes para si como muru ou curandeiro, padre ou imam, quanto delas aprovariam para que laves as suas mãos com água e sabão?

1	2	3	4	5
Nem um pouco	Um pouco	Medio	Fortemente	Muito fortemente

B179d Pessoas importantes para te como trabalhadores das ONGs, quanto delas aprovariam que sempre laves as suas mãos com água e sabão?

1	2	3	4	5
Nem um pouco	Um pouco	Medio	Fortemente	Muito fortemente

B180: Qual o nível de obrigação pessoal que você tem em lavar sempre as mãos com água e sabão?

1	2	3	4	5
Sem nenhuma obrigação pessoal	Fraca obrigação pessoal	Media obrigação pessoal	Forte obrigação pessoal	Muito forte obrigação pessoal

FATORES DE HABILIDADE NA LAVAGEM DAS MÃOS

B182: Tem a certeza de que você pode lavar as mãos sempre com água e sabão?

1	2	3	4	5
Nenhuma certeza	Pouca certeza	Meia certeza	Certeza	Muita certeza

B185: Qual é o nível de dificuldade para conseguir água suficiente que você precisa para lavar as mãos sempre com água e sabão?

1	2	3	4	5
Nenhuma dificuldade	Pouco dificuldade	Dificuldade media	Difícil	Muito difícil

B186: Qual é o nível de dificuldade que você tem em obter sabão suficiente para lavar as mãos sempre?

1	2	3	4	5
Nenhuma dificuldade	Pouco dificuldade	Dificuldade media	Difícil	Muito difícil

B187 Qual é o nível de dificuldade para encontrar tempo para lavar as mãos com água e sabão?

1	2	3	4	5
Nenhuma dificuldade	Pouco dificuldade	Dificuldade media	Difícil	Muito difícil

B188: Será que você está seguro quepode lavar as mãos com água e sabão, mesmo que tenha que andar alguma distância para chegar ao lugar mais próximo para lavar as mãos?

1	2	3	4	5
Não seguro	Um pouco seguro	Meio seguro	Seguro	Muito seguro

FATORES DE AUTO-REGULAÇÃO EM RELAÇÃO A LAVAGEM DAS MÃOS

B191: Quanta atenção presta para ter sempre em casa sabão suficiente para lavar as mãos com água e sabão?

1	2	3	4	5
Nenhuma atenção em tudo	Pouco de atenção	Media atenção	Muita atenção	Muitíssima atenção

B192 Favor seja honesto! Quando você pensa nas últimas 24 horas: Quantas vezes aconteceu que você se esqueceu de lavar as mãos com água e sabão?

1	2	3	4	5
(Quase) nunca (0%)	Raramente (25%)	Às vezes (50%)	Frequentemente(75%)	(Quase) sempre (100%)

B193: Se você pensar sobre as últimas 24 horas: Quantas vezes aconteceu você ter a intenção de lavar as mãos com água e sabão e, em seguida, esquecer-se de fazê-lo?

1	2	3	4	5
(Quase) nunca (0%)	Raramente (25%)	As vezes (50%)	Muitas vezes (75%)	(quase) sempre (100%)

B194: Quão importante é para você lavar as mãos com água e sabão?

1	2	3	4	5
Nada importante	Pouco importante	Meio importante	Importante	Muito importante

B195: Qual o nível de obrigação que você se sente em lavar as mãos com água e sabão?

1	2	3	4	5
Sem nenhuma obrigação	Fraca obrigação	Media obrigação	Forte obrigação	Muito forte obrigação

B196: Quando pensa na última semana: quantas vezes aconteceu não tinha água para lavar as mãos? _____ vezes. (0 = tinha sempre agua)

B197: Quando você pensa na última semana: quantas vezes é que aconteceu não tinha sabão para lavar as mãos? _____ vezes. (0 = tinha sempre sabão)

PLANO PARA ENFRENTAR AS BARREIRAS A RESPEITO DE LIMPEZA DE MÃOS

B198: Você tem um plano para fazer com que haja sempre água para lavar as mãos?
[0] □ Não tem plano [1] □ Plano, por favor especifique:.....

B199: Você tem um plano para quando não há água para lavar as mãos?
[0] □ Nenhum plano □ Plano, por favor especifique

Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!

1	Pedir ao vizinho, parentes, outros	**4**	Comer com colher/utensílios de cozinha
2	Ir buscar/comprar água	**5**	Gel de desenfeccão
3	Esfregar com pano/roupas	**6**	Outros:

B201: Você tem um plano para fazer com que haja sempre sabão para lavar as mãos?
[0] □ Não tem plano [1] □ Plano, por favor especifique:.....

B202: Você tem um plano para quando não há sabão para lavar as mãos?
[0] □ Não tem plano □ Plano, por favor especifique

Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!

1	Pedir emprestado ao vizinho, parente, outros	**4**	Usar cinzas
		5	Comprar sabão
2	Lavar com água/utilizar apenas água	**6**	Producir sabão (preto)
3	Usar areia	**7**	Outros:

B205 Quanto é sempre lavar as mãos com água e sabão dispendioso?

1	2	3	4	5
Não é dispendioso	Um pouco dispendioso	Meio dispendioso	Dispendioso	Muito dispendioso

B206 Acha que o dispositivo de lavagem das mãos está muito longe de sua área habitual de atividade?

1	2	3	4	5
Nem um pouco longe	Um pouco longe	Meio longe	Longe	Longíssimo

B207 **(Alberta!)** Quais são as dificuldades no que diz respeito à lavagem das mãos com água e sabão? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Sem água	**5**	Não há dificuldades
2	Sem Sabão	**6**	Não tem tempo
3	Esquecimento	**7**	Não sei
4	A distancia do furo de água	**8**	Outros:

Não tocar/evitar de tocar numa pessoa doente que pode estar sofrendo de Ébola

Por favor, informe o entrevistado!! A seguir, vamos falar sobre Ébola, quando uma pessoa apresentar sintomas de Ébola, não devemos tocar/devemos evitar de tocar nessa pessoa e devemos rapidamente ligar para a linha verde e informar o centro de saúde deste caso!!!!

B300: Segundo a sua opinião, qual é o nível de risco que você tem de poder contrair o Ébola, se você tocar em uma pessoa que está infetada de Ébola?

1	2	3	4	5
Não há risco	*Pouco Risco*	*Médio*	Alto risco	Risco muito elevado

B300a Se **1- 3** em ***B300***: Por que você acha que não há risco ou não há um risco elevado de você contrair o Ébola, se você tocar em uma pessoa que está infetada de Ébola?

[0] □ Não sei [1] □ Outros, por favor especifique: _____

ATITUDES EM RELAÇÃO A NÃO TOCAR/EVITAR DE TOCAR EM UMA PESSOA DOENTE

B301: Qual a certeza que você tem de que **NÃO TOCAR/EVITAR** tocar em uma pessoa doente previne de contrair Ébola?

1	2	3	4	5
Não tem certeza	*Pouca certeza*	*Meia certeza*	Certeza	Muita certeza

B301a Se **1- 3** em ***B301***: Por que não está certo ou muito certo de que não tocar em uma pessoa doente impede de contrair o Ébola?

[0] □ Não sei [1] □Outros, por favor especifique: _____

NORMAS RELATIVAS A NÃO TOCAR/EVITAR DE TOCAR EM UMA PESSOA DOENTE

Entrevistador: Por favor, explique ao participante do estudo: Nós estamos a procurar saber a perceção do entrevistado, e não o seu conhecimento!!

***B304b* (Aberto!)** O que os outros pensam se você **EVITE DE** tocar em uma pessoa que pode estar infetada de Ébola? **Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!**

1	Eles iriam pensar que não sou uma boa pessoa	**4**	Eles pensariam que sou egoísta
2	Eles iriam pensar que eu sou louco	**5**	Não sei
3	Eles pensariam que não quero ajudar essa pessoa	**6**	Outros:

FATORES DE HABILIDADE PARA NÃO TOCAR/EVITE TOCAR UMA PESSOA DOENTE

B308a Tem controlo sobre **EVITE tocar** numa pessoa que esteja infetada com Ébola enquanto essa pessoa está em sua casa?

1	2	3	4	5
Não está no meu controlo	*Controlo um pouco*	*Controlo médio*	Eu Controlo	Controlo sempre

B308b Se ***1- 3*** para ***B308a:*** Porque é que pensa que **NÃO** está sob seu controlo deixar de tocar numa pessoa que esteja infetada de Ébola, enquanto essa pessoa está em suacasa?

0□ não sei 1 □ Outros, favor especificar:…….

LIGANDO A LINHA VERDE PEDIDO DE ASSISTÊNCIA

B401: Podedizer-me o número da linha verde/emergência do Ébola? _____

1□ Eu não sabia que há uma linha verde da Ébola

2□ Eu tinha ouvido falar sobre o linha verde da Ébola mas eu esqueci o número.

⇨ ***Se o entrevistado não sabe este número: diga a ele/ela o número certo:***

Ligar para o Telefone 1919 MTN ou 2020 ORANGE e 605 00 02 INASA e comunicar de imediato.

ATITUDES EM RELAÇÃO À LINHA VERDE PEDIDO DE ASSISTÊNCIA

B402: Qual a certeza que você tem que ligando para a linha verde irá ajudá-lo ou uma outra pessoa que pode estar infetada de Ébola?

1	2	3	4	5
Não tem certeza	Pouca certeza	Meia certeza	Certeza	Muita certeza

B403: Se "***não tem certeza***": Porque é que não tem certeza que ligar para a linha verde vai ajudá-lo a siou à pessoa doente?
Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas!

1	É a vontade de Deus/decisão	**4**	Eu não sei
2	Centros de saúde ou médicos não podem ajudar	**5**	Não sei como me ajudaria
3	Não é possível tratar o Ébola	**6**	Outros:

NORMAS RELATIVAS À LINHA VERDE PEDIDO DE ASSISTÊNCIA

Entrevistador: Por favor, explique ao participante do estudo: Nós estamos a procurar a perceção do entrevistado, e não o seu conhecimento!!

B404: Quantas pessoas do seu agregado familiar iriam ligar para a linha verde se existisse uma pessoa em sua casa que pudesse estar infetada com Ébola?

1	2	3	4	5
(Quase) ninguém	*Alguns deles*	*Metade deles*	*A maioria deles*	(Quase) todos eles

B405 Se **1- 4** em ***B404***: Por que você acha que **NEM TODAS** as pessoas do seu agregado familiar iriam ligar para a linha verde se houvesse uma pessoa em sua casa que pudesse estar infetada com Ébola?

0 Não sei Outros, por favor especifique

1	Falta de telefone (funcionada)	**4**	Depende de cada um
2	Falta de rede	**5**	Porque há quem é responsavel
3	Falta de número	**6**	Outros:

B406: Quantas pessoas da sua Tabanca iriam ligar para a linha verde se existisse uma pessoa que pudesse estar infetada de Ébola na mesma casa?

1	2	3	4	5
(Quase) ninguém	*Alguns deles*	*Metade deles*	*A maioria deles*	(Quase) todos eles

B407 Se **1- 4** em ***B406:*** Por que você acha que nem todas as pessoas de sua Tabanca iriam ligar para a linha verde se houver uma pessoa que pudesse estar infetada de Ébola na mesma casa?

0 Não sei Outros, por favor especifique

1	Falta de telefone (funcionada)	**5**	Falta de conhecimento do Ébola
2	Falta de rede	**6**	Muitos são idosos
3	Falta de número	**7**	Não querer ligar
4	Depende de cada um	**8**	Outros:

B408a As pessoas que são importantes para você como seus familiares, quanto delas aprovariam que você ligaria para a linha verde e relatar o caso suspeito de Ébola na sua casa?

1	2	3	4	5
Nem um pouco	Pouco	Medio	Fortemente	Muito fortemente

B408b As pessoas que são importantes para você como amigos (da família), quanto delas aprovariam que você ligaria para a linha verde e relatar o caso suspeito Ébola na sua casa?

1	2	3	4	5
Nem um pouco	Pouco	Medio	Fortemente	Muito fortemente

B408c As pessoas que são importantes para você como funcionários de ONGs, quanto delas aprovariam que você ligaria para a linha verde e relatar o caso suspeito Ébola na sua casa?

1	2	3	4	5
Nem um pouco	Pouco	Medio	Fortemente	Muito fortemente

B409a As pessoas que são importantes na comunidade como muru ou curandeiro, padre ou imam, quanto delas aprovariam que você ligue para a linha verde e relatar o caso suspeito Ébola na sua casa?

1	2	3	4	5
Nem um pouco	Pouco	Medio	Fortemente	Muito fortemente

B409b As pessoas que são importantes na comunidade como chefe da comunidade, quanto delas aprovariam que você ligue para a linha verde e relatar o caso suspeito Ébola na sua casa?

1	2	3	4	5
Nem um pouco	Pouco	Medio	Fortemente	Muito fortemente

B411: Qual o nível de obrigação pessoal que você tem em ligar para a linha verde se houver uma pessoa que possa estar infetada com Ébola em sua casa?

1	2	3	4	5
Sem nenhuma obrigação pessoal	Fraca obrigação pessoal	Media obrigação pessoal	Forte obrigação pessoal	Muito forte obrigação pessoal

FATORES DE HABILIDADE EM RELAÇÃO À LINHA VERDE PEDIDO DE ASSISTÊNCIA

B412: Qual é o nível de dificuldade para ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

1	2	3	4	5
Nem um pouco difícil	*Pouco difícil*	*Meio difícil*	*Difícil*	*Muito difícil*

B413 Se **2-5** em ***B412***: Por que você acha que seria difícil ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

0 Não sei Outros, por favor especifique

1	2	3	4	5
Falta de telefone (funcionada)	Falta de rede	Falta de numero	Falta de carga/saldo/meios	Outros:

B414: Será que você está seguro (confiante) em poder ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

1	2	3	4	5
Nada seguro	*Pouco seguro*	*Meio seguro*	Seguro	Muito seguro

B415 Se ***1- 3*** em ***B414***: Por que não está totalmente confiante (seguro) de que você pode ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

0 Não sei Outros, por favor especifique

1	2	3	4	5
Falta de telefone (funcionada)	Falta de rede	Falta de numero	Falta de carga/saldo/meios	Outros:

FATORES DA AUTO-REGULAÇÃO A RESPEITO DA LINHA VERDE PEDIDO DE ASSISTÊNCIA

B416: Quão importante é para si ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

1	2	3	4	5
Nada importante	Pouco importante	Meio importante	Importante	Muito importante

B417 Qual é o nível de obrigação que você se sente em ligar para a linha verde e relatar um caso suspeito de Ébola em sua casa?

1	2	3	4	5
Sem nenhuma obrigação	Fraca obrigação	Media obrigação	Forte obrigação	Muito forte obrigação

B418 **(Aberto!)** Qual pode ser a razão de **NÃO ligar para a linha verde** havendo um caso suspeito de Ébola na sua familia?

Entrevistador: Pergunte e marque de acordo com a afirmação!! É possível mais do que uma resposta! Não leia as respostas! Si la resposta é: falta de carga/saldo, dize a pessoa: e gratuito!!!

1	A Polícia colocará a minha família em quarentena	**6**	Falta de numero
2	Outras pessoas pensarão que não somos limpos/higiénicos	**7**	Vergonha
3	Falta de telefone (funcionando)	**8**	Não sei
4	Falta de rede	**9**	Outros:
5	Nada pode impedir		

SUPORTE SOCIAL

B577 Na sua familia, lembram-se uns aos outros para lavar as mãos com água e sabão?

1	2	3	4	5
Nunca	Raramente	As vezes	Frequentemente	Sempre

SUPORTE DISPONÍVEL PERCEBIDA

B579 Em que medida podes depender de seu marido / a chefe da família / outras pessoas quando você de gastar dinheiro para o sabão?

1	2	3	4	5
Nunca	Raramente	As vezes	Frequentemente	Sempre

B580 O seu marido / chefe da família // outras pessoas te ajuda quando está preocupado com o fato de gastar dinheiro para comprar sabão?

1	2	3	4	5
De modo nenhum	Um pouco	Meio	Fortemente	Muito fortemente

SUPORTE VERDADEIRAMENTE RECEBIDO (RECEBIDOR)
Durante a última semana, como é o seu marido / chefe da família reagiu com você?

B582 O seu marido / chefe da familia / outras pessoas te ofereceu dinheiro ou te abordou duma outra maneira a fim de comprar sabão?

1	2	3	4	5
De modo nenhum	Um pouco	Meio	Fortemente	Muito fortemente

B583 O seu marido / chefe da família / outras pessoas te encoraja a não deixares de gastar dinheiro para comprar sabão a fim de lavar as mãos?

1	2	3	4	5
De modo nenhum	Um pouco	Meio	Fortemente	Muito fortemente

MEDIDAS SUBSTITUTAS DE HIGIENE - 2

B154: Pode mostrar-me como você costuma lavar as mãos? [1] *sim* [0] Não, não tem permissão para ver

Entrevistador: Se for dada a permissão para ver, observa como as pessoas seguem as lavagens das mãos!

Se não tem permissão para ver → ir para B158 abaixo

B155: ***Inquiridor: Observar***! Como a pessoa lava assuas mãos?

1	2	3	4	5	6
Lava uma mão com água	Lavas ambas as mãos com água	Lava uma mão com água e sabão	Lavas as mãos com água e sabão	Lavas as mãos com água e sabão dentro de um recipiente	Outros:

B158: Você tem um lugar e dispositivo específico para lavar as mãos? (por exemplo balde c/ caneca/tippy tap)
[1] *sim* [0] não

B159 Se **SIM** em ***B158***: Você pode me mostrar isso? [1] sim [0] Não, não permissão para ver

Entrevistador: Se NÃO ao B158 ou NÃO em B159 → ir para B166

B160 Inquiridor: Observar! Onde está instalado o dispositivo para lavar as mãos (por exemplo, balde/caneca/tippy tap) localizado?

1	Dentro ou perto da latrina	**4**	Fora da casa, perto da porta
2	Dentro da casa, perto da cozinha	**5**	Em outras partes da comunidade
3	Em outra parte da casa	**6**	Outros:

B161 Inquiridor: Observar! A água está no local específico? [1]□ Sem água [2]□ Com água

B162 Inquiridor: Observar! O dispositivo para a água que é usado num local específico?

1	Tippy tap	**4**	Balde
2	Caneca/copo	**5**	Jerrican/Bidão
3	Ponto de água em construção	**6**	Outros:

B163 Inquiridor: Observar! O sabão/ detergente ou outro produto está presente no local específico e que tipo de sabão está? **É possível mais do que uma resposta!**

1	2	3	4	5	6	7	8	9
Nenhum	Sabão em pó	Sabão de banho	Sabão líquido (incluindo shampoo)	Sabão de barra	Areia	Cinza	Sabão preta	Outro:

B165: A facilidade permite a lavagem e enxaguamento sem ajuda de ambas as mãos? [1]□ sim [0]□ não

B166 Para defecação, você usa: [1]□ a casa de banho na sua casa? [2]□ a casa de banho de vizinho? [3]□ não uso casa de banho, o faço á céu aberto.

B167 *If **1** for **B166***: **Observa!** Existe um lugar específico para lavar as mãos após o contato com fezes?

1	2	3
Não, é a mesma para lavar as mãos depois de pegar a comida.	Sim, é diferente para o lugar de lavar as mãos depois de pegar a comida.	Não

SRQ-20

As perguntas a seguir estão relacionadas a certas dores e problemas que podem tê-lo incomodado nos últimos 30 dias. Se você acha que a questão se aplica a você e você teve o problema descrito nos últimos 30 dias, a resposta é SIM. Por outro lado, se a questão não se aplica a você e você não tem o problema nos últimos 30 dias, responda NÃO. Por favor, não discutir as questões com ninguém ao responder o questionário. Se você está inseguro sobre como responder a uma pergunta , por favor, dar a melhor resposta possível.

M1. Você tem dores de cabeça freqüente?

[1]□ sim [0]□ não

M2. Tem falta de apetite?

[1]□ sim [0]□ não

M3. Dorme mal?

[1]□ sim [0]□ não

M4. Assusta-se com facilidade?

[1]□ sim [0]□ não

M5. Tem tremores nas mãos?

[1]□ sim [0]□ não

M6. Sente-se nervoso (a), tenso (a) ou preocupado (a)?

[1]□ sim [0]□ não

M7. Tem má digestão?

[1]□ sim [0]□ não

M8. Tem dificuldades de pensar com clareza?

[1]□ sim [0]□ não

M9. Tem se sentido triste ultimamente?

[1]□ sim [0]□ não

M10. Tem chorado mais do que costume?

[1]□ sim [0]□ não

M11. Encontra dificuldades para realizar com satisfação suas atividades diárias?

[1]□ sim [0]□ não

M12. Tem dificuldades para tomar decisões?

[1]□ sim [0]□ não

M13.Tem dificuldades no serviço (seu trabalho é penoso, lhe causa- sofrimento?)

[1]□ sim [0]□ não

M14. É incapaz de desempenhar um papel útil em sua vida?

[1]□ sim [0]□ não

M15. Tem perdido o interesse pelas coisas?

[1]□ sim [0]□ não

M16. Você se sente uma pessoa inútil, sem préstimo?

[1]□ sim [0]□ não

M17. Tem tido idéia de acabar com a vida?

[1]□ sim [0]□ não

M18. Sente-se cansado (a) o tempo todo?

[1]□ sim [0]□ não

M19. Você se cansa com facilidade?

[1]□ sim [0]□ não

M20. Têm sensações desagradáveis no estomago?

[1]□ sim [0]□ não

DADOS DO AGREGADO FAMILIAR

B502: As despesas mensais: _____ FCFA -[9] □ Não sei

B503: Despesas diária: _____ FCFA -[9] □ Não sei

B504: Salario/rendimento mensal

1	< 50.000 FCFA	**6**	Entre 200.000 e 300.000 FCFA
2	Entre 50.000 e 75.000 FCFA	**7**	Entre 300.000 e 400.000 FCFA
3	Entre 75.000 e 100.000 FCFA	**8**	400.000 ou mais FCFA
4	Entre 100.000 e 150.000 FCFA	**9**	Eu não sei
5	Entre 150.000 e 200.000 FCFA		

B504a Quantas pessoas da sua família estão a trabalhar?.....

Será que o seu agregado familiar tem:

B600 Computador [1]□ sim [0]□ não

B601 Frigorifico [1]□ sim [0]□ não

B602 Rádio [1]□ sim [0]□ não

B603 Televisão [1]□ sim [0]□ não

B605 Eletrecidade [1]□ sim [0]□ não

Será que algum membro do seu agregado familiar possui / ter:

B606 Relógio [1]□ sim [0]□ não

B607 Bicicleta [1]□ sim [0]□ não

B608 Carro ou camião [1]□ sim [0]□ não

B609 Um carinho de tração animal [1]□ sim [0]□ não

B610 Telefone celular [1]□ sim [0]□ não

B611 Mota / scooter [1]□ sim [0]□ não

B612 Barco/ Canoa com motor [1]□ sim [0]□ não

B613 Será que algum membro da sua família tem conta bancária? [1]□ sim [0]□ não

B614 Será que no seu agregado familiar têm água corrente? [1]□ sim [0]□ não

B615 **(Aberto!)** Qual é a principal fonte de água potável para os membros do seu agregado familiar ?

1	2	3	4	5
Água canalizada	Poço tradicional	Água da primavera/Chuva	Poço melhorado	Outros:_____

B616 **(Aberto!)** Qual é a principal fonte de água utilizada na sua casa para outros fins, tais como cozinhar e lavar as mãos?

1	2	3	4	5
Água canalizada	Poço tradicional	Água da primavera/Chuva	Poço melhorado	Outros:_____

B617 **(Aberto!)** Onde está localizada essa fonte de água?

1	2	3
Na própria habitação	No próprio quintal/terreno	Em outro lugar

B618 Quanto tempo leva para ir lá, buscar água, e voltar? Minutos:…….....[9]□ Eu não sei

B619 Será que o seu agregado familiar tem mosquiteiros? [1]□ sim [0]□ não

B620 Quantos mosquiteiros existem no seu agregado familiar? Podes mostrar-me? Número de mosquiteiros:.....

B621 Será que alguém dormiu debaixo deste mosquiteiro a noite passada? [1]□ sim [0]□ não

***B622* (Aberto!)** Que tipo de instalações sanitárias é que os membros do seu agregado familiar usam?

1	2	3	4
Lave ou derramar autoclismo	Latrina melhorada	Latrina tradicional	Outros:_____

B623 Você compartilha estes instalações sanitárias com outras famílias? [1]□ sim [0]□ não

B624 Incluindo o seu próprio agregado familiar quantas famílias usam banheiro facilitado? Nr. das famílias:.....

B625 Onde esta localizado o seu banheiro facilitado?

1	2	3
Na própria habitação	No próprio quintal/terreno	Em outro lugar

B626 A comida geralmente é preparada em casa, em casa separada, ou ao ar livre?

1	2	3	4
Em casa	Em casa separada	Ao ar livre	Outros:

B627 Existe uma sala separada para cozinha? [1]□ sim [0]□ não

B628 Quantos quartos nesta casa são usados para dormir ? Número de quartos:.....

B629 Será que têm algum animal na sua familia? [1]□ sim [0]□ não

Se SIM: Quantos dos seguintes animais domésticos têm?

B630a Vaca ou touros? .....

B630c Cavalos, porcos, ou burro?.....

B630d Cabras? .....

B630e Ovelha?.....

B630f Galinhas ou outros aves domésticas?.....

B631 Será que algum membro do seu agregado familiar possui qualquer terra agrícola [1]□ sim [0]□ não

Muito obrigado por ter dispensado o seu tempo para conversar connosco! Nós terminamos a entrevista!

Tempo do fim: _____

Uso Oficial: (somente para o supervisor!)

Verificado: □ Sim

Nome: _____

Os dados inseridos **1**: □ sim iniciais: _____

Appendix II: Supplementary Material Chapter III

Questionnaire (English version)

Hand washing behavior, intention to take action to prevention behaviors and evaluation of implemented Ebola prevention activities, The Gambia

Questionnaire

Structured Interviews April 2015

For the interviewers:

- **Start at the agreed place and try to interview every second household.**
- **Please interview *the person of the household who is responsible for the care of the sick!!!***
- **Please write down how many households did not want to be interviewed before you found this household who takes part in the interview and in how many households no one was present.**

A1 Number of households not wanting to be interviewed: .....

A2 Number of households where nobody was at home: .....

Introduction

Please introduce yourself!

Hello, my name is _____ and I am working for Eawag, the Swiss Institute for Water Research, in collaboration with Concern Universal and TARUD/FFHC.

I would like to speak with the person of the household who is responsible for the care of the sick.
We are conducting a research study on hygiene practices and Ebola prevention behaviors.

Your participation in this study will help us better understand Ebola prevention practices of families in The Gambia. You may leave the interview with a better understanding and appreciation for Ebola prevention behaviors.

If you don't mind, I would like to interview you about hygiene practices and Ebola. It will last approximately one hour. Do you have the time for the interview? You can continue with your daily work, that does not disturb us. We are also interviewing other households in your community and other communities in Gambia.

We would like to know about your perceptions of different behaviors with regard to Ebola, so that we can improve the Ebola response, depending on this information. You can help us better if you answer as honestly and accurately as possible. Please help us understand what the real situation is!

***A3* Has the person given her oral consent?** [1]☐ yes [0]☐ no

⇨ **If YES: please start with the interview**

⇨ **If NO: Say thank you and goodbye!**

General information regarding the interview

B100 ID number of the household (to fill out by the supervisor!!) .....

B100a Beneficiary: [1]☐ yes [2]☐ no

B101 Date of the interview: .....

B102 Name of the interviewer: .....

B103 Name of the region: [1]☐ West Coast Region (WCR) [2]☐ Lower River Region (LRR)

B104 Name of the community:……..

Ebola prevention: Behaviors, intentions to take action and evaluation of promotion activities – Questionnaire

Data of the interviewed person

B105 Start time: .....

B106 Name of respondent = name of the primary care provider (=person who is responsible for the care of the sick) (All names!):……

B107 Name of head of household (All names!):……..

B108 Mobile number of respondent:……□[999] Refused/no number

B109 Sex of respondent: [1]□ Female [0]□ Male

B110 Age:…… [999]□ Refused/ I don't know

Interviewer: For B111 to B116 ask open-ended and check the according box! ***(1 answer!)***

B111 Marital status

1	2	3	4	5
Married	Single	Widowed	Divorced/separated	Cohabiting

B112 Are you able to read or write?

1	2	3
Can neither read nor write	Can read only	Can both read and write

B113 Education

1	Primary school	**4**	Quranic School
2	Secondary school	**5**	None
3	High school	**6**	Other:

B114 Religion

1	Muslim	**4**	Traditional beliefs
2	Christian	**5**	None
3	Protestant	**6**	Other:

B115 Ethnicity

1	Wolof	**3**	Mandinka	**5**	Karonika	7	Manjago
2	Fula	**4**	Jola	**6**	Serere	8	Other:

B116 Household's main type of livelihood

1	Farming	**3**	Trading	**5**	Unskilled form of livelihood	**7**	Fishing
2	Daily laborer	**4**	Skilled form of live-lihood	**6**	Other independent work (forest products)	**8**	Other:

B120 Interviewer: Ask if you can wash your hands **(Please, can I wash my hands?)**
Interviewer: Please specify if you were offered soap, or something else.

1	2	3	4	5	6	7	8
Only water	Only ash	Only sand	Soap and water	Ash and water	Sand and water	Not al-lowed/permitted to wash hands	Other:

Ebola knowledge

Please inform the respondent!! In the following we will talk about Ebola and health issues.

B900 **(Open!)** Can you tell me what causes Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!***

1	Infected fruit bats, monkeys/apes or warthogs	5	It is the will of god
2	After committing a sin	6	It will randomly spread
3	Its witchcraft	7	I don't remember/I don't know
4	A virus	8	Other:

B901* (Open!)** How can you get infected by Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	Contact with infected fruit bats, monkeys/apes or warthogs	14	Through direct contact with the urine of infected people
2	Consumption of raw meat from infected fruit bats or monkeys/apes or warthogs/consumption of bush meat	15	Through direct contact with vomit of infected people
3	Direct or close contact with people with Ebola symptoms/ direct contact with suspected person	16	Burial ceremonies in which mourners have direct contact (washing, touching) with the body of a due to Ebola deceased person
4	Through body fluids of infected people	17	Through direct contact with sweat of infected people
5	Not having/using toilets/poor sanitation	18	Through semen of infected people
6	By dirt	19	Through the air
7	By dirty water	20	Its witchcraft
8	If you don't wash your hands when you should wash them	21	Through vaginal fluid of infected people
9	If you are not clean/lack of hygiene	22	If you go the a health centre/hospital
10	Through direct contact with the spittle of infected people	23	It is the will of god
11	Through the breast milk of an infected woman	24	Travelling to and from affected countries
12	Through direct contact with the blood of infected people	25	I don't remember/I don't know
13	Through direct contact with the feces of infected people	26	Other:

Interviewer:
Read the questions and answers to the participant. Tell other people present during the survey not to help.

B902 Men who have recovered from the disease can still transmit the virus through their semen for up to 90 days after recovery from illness. [1]□yes [0]□ no [9]□ I don't know

B902a Preparation or consumption of bush meat (definition: raw meat from infected fruit bats or monkeys/apes or warthogs) can be a risk factor for the transmission of Ebola.

[1]□yes [0]□ no [9]□ I don't know

B903 People are infectious as long as their blood and body fluids, contain the virus. [1]□yes [0]□ no [9]□I don't know

B904 Ebola spreads through the air. [1]□yes [0]□ no [9]□ I don't know

B905 Is it possible to recover from Ebola? [1]□yes [0]□ no [9]□ I don't know

B906 The time from the first contact with the Ebola virus (e.g. in bush meat, blood or other body fluids of an infected person) until you will get the first symptoms (=effects on your body) is 2 to 21 days.

[1]□yes [0]□ no [9]□ I don't know

B907 Can people transfer Ebola to others immediately after being infected? .

[1]□yes [0]□ no [9]□ I don't know

B908 At the beginning, it is easy to distinguish Ebola from other infectious diseases such as malaria, typhoid fever and meningitis.

[1]□yes [0]□ no [9]□ I don't know

B908a Direct contact with a suspected person can be a risk factor for the transmission of Ebola.
[1]□yes [0]□ no [9]□ I don't know

B909 Humans are not infectious until they develop symptoms. [1]□yes [0]□ no [9]□ I don't know

B910 The bodies of people who died because of Ebola carry the virus. [1]□yes [0]□ no [9]□ I don't know

Ebola prevention: Behaviors, intentions to take action and evaluation of promotion activities – Questionnaire

B911* (Open!)** What are the first symptoms of Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	Fever	5	Tiredness
2	Muscle pain	6	Nausea
3	Headache	7	I don't remember/I don't know
4	Sore throat	8	Other:

Interviewer:

Read the questions and answers to the participant.

B912 Fever can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B913 Thirst can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B914 Tiredness can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B915 Hair loss can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B916 Muscle pain can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B917 Sore throat can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B918 Blue nails can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B919 Headache can be a first symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B920* (Open!)** After the signs and symptoms we just talked about, what happens next? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	You can become very sick.	8	Vomit may contain blood
2	Vomiting	9	Diarrhea may contain blood
3	Diarrhea	10	Cough may contain blood
4	Cough	11	Heavy headache
5	Bleeding (internal and external), mostly from nose and mouth	12	I don't remember/I don't know
6	Blood in the stools	13	Other:
7	Rash		

Interviewer:

Read the questions and answers to the participant.

B920a Bleeding (internal and external), mostly from nose and mouth can be a symptom of Ebola.

[1]□yes [0]□ no [9]□ I don't know

B920b Rash is a symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B920c Vomiting can be a symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B920d Blood in the diarrhea/stool can be a symptom of Ebola. [1]□yes [0]□ no [9]□ I don't know

B921* (Open!)** Can you tell me how you can prevent getting Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	Avoid direct contact with infected persons and dead bodies due to Ebola	9	Avoiding the consumption of bush meat
2	Construction of toilets	10	Protecting the food
3	Drinking/having clean water	11	Good hygiene and maintaining a clean environment
4	Pray to God/God prevents us from it	12	It is not possible to prevent getting Ebola
5	Regular hand washing with soap and water after visiting patients in hospital	13	Managing the suspected case
6	Regular hand washing with soap and water at key times (before eating, after contact with feces)	14	I don't remember/I don't know
7	Avoid direct contact with the bodily fluids from infected people	15	Calling the Ebola hotline
8	Regular hand washing with soap and water after taking care of patients at home	16	Other:

Interviewer: Read the questions and answers to the participant:

Question: Can you protect yourself from getting Ebola with the following behaviors?

B922 By avoiding direct contact with infected persons and dead bodies due to Ebola? [1]□yes [0]□ no [9]□ I don't know

B923 With regular hand washing with soap and water at key times (before eating, after contact with feces)?

[1]□yes [0]□ no [9]□ I don't know

B924 By boiling your drinking water? [1]□yes [0]□ no [9]□ I don't know

B925 By avoiding direct contact with the bodily fluids (blood, feces, vomit, urine) from infected people?

[1]□yes [0]□ no [9]□ I don't know

B926 By drinking a lot of clean water? [1]□yes [0]□ no [9]□ I don't know

B926a By avoiding the consumption of bush meat? [1]□yes [0]□ no [9]□ I don't know

B927* (Open!)** Can you tell me what to do if you or someone of your family has the signs and symptoms of Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	2	3	4	5	6
Bring the sick person to a treatment centre	Call the Ebola hotline and report the suspected case	Isolation of the person and avoid to touch him/her or his/hers body fluids	I don't remember	I don't know	Other:

Action knowledge

B181* (Open!)** What are the critical or most important moments for washing hands with soap and water? ***Interviewer: Ask open-ended and check the according boxes. Do NOT read the answers!!More than one answer possible!

1	2	3	4	5	6	7	8
After defecation	After wiping a child's bottom	Before cooking/ preparing food	Before feeding a child	Before eating	Before drinking	After taking care of a sick person	Other:

⇨ **Tell the respondent: if we talk in the following from critical moments or key moments, we mean:** After defecation, after wiping a child's bottom, before cooking/ preparing food, before feeding a child, before eating

Hand washing practices of children

Please inform the respondent!! In the following we will talk about hand washing and children.

B210 Do you teach your children to wash hands with soap and water at critical moments? [1] *yes* [0] no➔ ***B150***

B211 If YES to B210: Is it difficult to teach your children to wash hands with soap and water at critical moments? [1] *yes* [0] no

B212 If YES to B211: Why is it difficult?

(Open!): ***Interviewer: Ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible! After every answer, ask if the respondent knows other difficulties.***

1	2	3	4	5	6
They don't listen	They don't believe that it is important	They forget it	They don't like it	I forget to tell them that they should wash their hands	Other:

Hygiene proxy measures - 1

B150 **(Open!):** With what do you clean your hands usually?

Interviewer: Ask open-ended and check the according box. Do NOT read the answers!!

1	2	3	4	5	6	7
Only water	Only ash	Only sand	Soap & water	Ash & water	Sand & water	Other:

B151 Do you have soap? [1] yes [0] no

B152 How much money does your household spend on soap per month? …….. GMD [-9] Don't know

B153 **(Open!):** Usually, what kind of soap do you have at home? ***Interviewer: Ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!***

1	2	3	4	5	6
Usually no soap	Liquid soap	Laundry soap	Bathing soap	Soap powder	Other:

Behavior intentions

B1 How strongly do you intend to always wash hands with soap and water before handling food (before eating, feeding a child, preparing or cooking food) ?

1	2	3	4	5
Not at all	A little	Quite	Strongly	Very strongly

B2 How strongly do you intend to always wash hands with soap and water after contact with feces (after wiping a child's bottom, after defecation and after other contact with feces)?

1	2	3	4	5
Not at all	A little	Quite	Strongly	Very strongly

B360 How strongly do you intend **TO NOT TOUCH** a sick person who might suffer from Ebola in your household?

1	2	3	4	5
Not at all	A little	Quite	Strongly	Very strongly

B400 How strongly do you intend to call the Ebola hotline if you would have a person with suspected Ebola in your household?

1	2	3	4	5
Not at all	A little	Quite	Strongly	Very strongly

B400b If you do not have coverage in your household, how strongly would you try to travel to somewhere to find coverage in order to call the Ebola hotline if you would have a person with suspected Ebola in your household?

1	2	3	4	5
Not at all	A little	Quite	Strongly	Very strongly

B400c All things considered (e.g. no network, other barriers), how likely is it that you actually will call the Ebola hotline if you would have a person with suspected Ebola in your household?

1	2	3	4	5
Not at all likely	A little likely	Quite likely	Likely	Very likely

Behavioral Willingness

Please inform the respondent. Now we would like to ask you to imagine yourself in a certain situation. We are not suggesting that you would be in this situation. However, we would like you to think about this situation and how you would respond in them.

Suppose you were the whole day at the market, to sell vegetables. At the end of the day, you go home and you find a member of your family who is vomiting and the vomit contains blood, which can be a symptom for Ebola. In those circumstances, how willing would you be to do each of the following?

B44 **NOT TOUCH** the sick person, thus reducing the risk of getting Ebola.

1	2	3	4	5
Not at all willing	*A little willing*	*Quite willing*	Willing	Very willing

B44a If 1-3 for B44: Why would you **NOT BE WILLING** or **NOT VERY WILLING NOT TO TOUCH** the sick person to reduce the risk for you to get Ebola?

[0]❑ I don't know [1]❑ Other, please specify:……

B45 To call the Ebola hotline and report the suspected Ebola case in your household.

1	2	3	4	5
Not at all willing	*A little willing*	*Quite willing*	Willing	Very willing

B45a If 1-3 for B45: Why would you **NOT BE WILLING OR VERY WILLING TO CALL THE EBOLA HOTLINE** and report the suspected Ebola case in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

Behavioral measures

B170 In general, do you wash your hands with soap and water less than 3 times per day; 4 – 9 times a day; 10 or more times a day?

[1] ❑ ≤ 3 times per day [2] ❑ 4 – 9 times a day [3] ❑ ≥ 10 times a day

B4 Before you eat, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B5 Before you breastfeed a child, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B6 Before you feed a child, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B7 Before you cook, cut or prepare food, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B9 After you defecated, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B10 After you wiped a child's bottom, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B11 After other kinds of contacts with feces, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B14 Do you wash your hands with soap and water frequently?

1	2	3	4	5
Not at all frequently	A little frequently	Medium frequently	Frequently	Very frequently

B16 Do you wash your hands with soap and water without thinking?

1	2	3	4	5
Not at all without thinking	Hardly without thinking	Medium without thinking	Without thinking	Without thinking at all

Health status and awareness

Please inform the respondent!! In the following we will talk about health risks concerning Ebola.

B123 How high do you feel is the risk that you get Ebola?

1	2	3	4	5
No risk	LITTLE RISK	MEDIUM RISK	A RISK	HIGH RISK

Go to B125

B124 **(Open!)** ***If "NO RISK":*** Why do you think there is **NO RISK** that you get Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!***

1	In my region there is no Ebola	7	God is protecting me/us
2	I always wash my hands with soap and water	8	Because no one in the family got it so far
3	I don't know somebody who is suffering from Ebola	9	Because of hygiene/cleanliness
4	Because of prevention/carefulness/good behavior	10	I don't know
5	Because we follow the advice/rules/what they said (promoter from Concern Universal)	11	Other:
6	I never eat bush meat		

B125 **(Open!)** ***If answer 2-5 for B123:*** Why do you think that **THERE IS A RISK** that you get Ebola? ***Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!***

1	Because it is God's will/decision	4	Because the smallest neglect can cause it
2	I eat bush meat	5	I don't know
3	You can get it even if you are careful/clean/precautious	6	Other:

B126 How high do you feel is the risk that someone of your household gets Ebola?

1	2	3	4	5
No risk	Little risk	Medium risk	A risk	High risk

B127 How high do you think is the risk for an average person of your community to get Ebola?

1	2	3	4	5
No risk	Little risk	Medium risk	A risk	High risk

B128 How likely is it that you get Ebola if you **DO NOT** protect yourself with regular hand washing with soap and water at critical moments?

1	2	3	4	5
Not at all likely	A little likely	Quite likely	Likely	Very likely

B129 How likely is it that you get Ebola **IF YOU PROTECT** yourself with regular hand washing with soap and water at critical moments?

1	2	3	4	5
Not at all likely	A little likely	Quite likely	Likely	Very likely

Imagine that you contracted Ebola, how severe would be the impact on…

B130 … your life in general?

1	2	3	4	5
Not severe	A little severe	Quite severe	Severe	Very severe

B131 … your social life?

1	2	3	4	5
Not severe	A little severe	Quite severe	Severe	Very severe

B132 … your economic situation?

1	2	3	4	5
Not severe	A little severe	Quite severe	Severe	Very severe

Communication

B133 How often do you talk about hand washing with soap, ash or sand and water and health with others?

1	2	3	4	5
Never	*Seldom*	*Sometimes*	*Often*	*Very often*

B134 If 2-5 to ***B133:*** When you talk about hand washing with soap, ash or sand and water and health, do you talk positively or not positively about it?

1	2	3	4	5
Not at all positively	A little positively	Quite positively	Positively	Very positively

B135 How often do you talk about the Ebola hotline you can call if you would have a suspected case of Ebola in your household?

1	2	3	4	5
Never	*Seldom*	*Sometimes*	*Often*	*Very often*

B136 If 2-5 to ***B135:*** When you talk about this Ebola hotline, do you talk positively or not positively about it?

1	2	3	4	5
Not at all positively	A little positively	Quite positively	Positively	Very positively

Hand washing with soap

Please inform the respondent!! In the following we will talk about washing hands with soap and water.

B145 Since this time yesterday, did you wash your hands with soap and water? [1]❑ Yes [0]❑ No

B146 If YES to B145: What was the situation or reason for washing your hands with soap and water? Please name each situation.

Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	After using the toilet	7	After wiping a child's bottom
2	After other kinds of contacts with feces	8	After caring for a sick person
3	After coming home from outside/market/etc.	9	After eating
4	Before cooking, cutting or preparing food	10	Before feeding a child
5	Before eating	11	I don't remember/I don't know
6	Before handling drinking water	12	Other:

B147* (Open!):** In general, why do you wash your hands with soap and water? ***Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	Against bacteria (to avoid bacteria/germs/microbes)	7	Against sickness (to avoid sickness/illness/ infection)
2	Against diarrhea/Ebola/other diseases	8	To protect health (to protect life/ body)
3	To protect our children/baby (from Ebola/ illness)	9	Because of hygiene
4	Against dirt/smell (because of dirt/grease/smell)	10	Group behavior (everyone does it)
5	Compliance/obligation (they told me so/I have to do it)	11	Don't know
6	Habit (it's what I'm used to/what I have always done/it's a habit)	12	Other:

B171 Considering your frequencies of hand washing, how high do you feel is the risk that you contract Ebola?

1	2	3	4	5
No risk	Little risk	Medium risk	A risk	High risk

Attitudes regarding hand washing

B172 Do you think that always washing hands with soap and water takes a lot of effort?

1	2	3	4	5
Takes no effort	Takes a little effort	Takes quite effort	Takes effort	Takes much effort

B173 How time-consuming do you think it is to always wash hands with soap and water?

1	2	3	4	5
Not time-consuming at all	A little time-consuming	Medium time-consuming	Time-consuming	Very time-consuming

B174 How certain are you that always washing hands with soap and water prevents you and your family from getting diseases like Ebola or diarrhea?

1	2	3	4	5
Not certain at all	A little certain	Medium certain	Certain	Very certain

B175 How much do you like always washing hands with soap and water?

1	2	3	4	5
I don't like it at all	I like it a little	I medium like	I like it	I like it very much

Norms regarding hand washing with soap and water

Interviewer: Please explain to the study participant: *We are looking for the perception of the respondent, not for his/her knowledge!! Ask, what do you think,…*

B177 How many people of your household always wash hands with soap and water?

1	2	3	4	5
(Almost) nobody	Some of them	Half of them	Most of them	(Almost) all of them

B178 How many people of your village always wash hands with soap and water?

1	2	3	4	5
(Almost) nobody	Some of them	Half of them	Most of them	(Almost) all of them

B179 People who are important to you (e.g. your family members, friends, a Marabout, Imam, other important people), how much do they approve that you always wash your hands with soap and water?

1	2	3	4	5
Not at all	A little	Medium	Strongly	Very strongly

B180 How strongly do you feel a personal obligation to yourself to always wash hands with soap and water?

1	2	3	4	5
No personal obligation at all	Weak personal obligation	Medium personal obligation	A strong personal obligation	Very strong personal obligation

Ability factors regarding hand washing

B182 How sure are you that you can always wash your hands with soap and water?

1	2	3	4	5
Not at all sure	A little sure	Medium sure	Sure	Very sure

B185 How difficult is it to get as much water as you need to always wash hands with soap and water?

1	2	3	4	5
Not at all difficult	A little difficult	Medium difficult	Difficult	Very difficult

B186 How difficult is it to get as much soap as you need to always wash hands with soap and water?

1	2	3	4	5
Not at all difficult	A little difficult	Medium difficult	Difficult	Very difficult

B187 How difficult is it to find the time to wash hands with soap and water?

1	2	3	4	5
Not at all difficult	A little difficult	Medium difficult	Difficult	Very difficult

B188 How confident are you that you can wash hands with soap and water, even if you have to walk some distance to reach the next hand washing facility?

1	2	3	4	5
Not at all confident	A little confident	Medium confident	Confident	Very confident

Self-regulation factors regarding hand washing

B190 In your family do you ever remind each other to wash hands with soap and water?

1	2	3	4	5
Never	Seldom	Sometimes	Often	Very often

B191 How much do you pay attention to always have enough soap at home to wash hands with soap and water?

1	2	3	4	5
No attention at all	A little attention	Medium attention	Much attention	Very much attention

B193 When you think about the last 24 hours: How often did it happen that you intended to wash hands with soap and water and then forgot to do so?

1	2	3	4	5
(Almost) never (0%)	Seldom (25%)	Sometimes (50%)	Often (75%)	(Almost) always (100%)

B194 How important is it for you to wash hands with soap and water?

1	2	3	4	5
Not at all important	A little important	Medium important	Important	Very important

B195 How committed do you feel to wash hands with soap and water?

1	2	3	4	5
Not at all committed	A little committed	Medium committed	Committed	Very committed

***B196* (Open!)** When you think about the last week: how often did it happen that there was no water for hand washing? ……times.

***B197* (Open!)** When you think about the last week: how often did it happen that there was no soap for hand washing? ……times.

Barriers and coping plan regarding hand cleansing

B198 Do you have a plan what to do so that you always have water for hand washing?

[0]❑ No plan [1]❑ Plan, please specify:……

B199 Do you have a plan what to do when there is no water for hand washing?

[0]❑ No plan [1]❑ Plan, please specify: ➔ **B200**

B200 Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	Ask neighbor, relatives, other	4	Eat with spoon/eating utensils
2	Fetch water (soon)	5	Other:
3	Rub with cloth/clothes		

B201 Do you have a plan what to do so that you always have soap for hand washing?

[0]❑ No plan [1]❑ Plan, please specify:……

B202 Do you have a plan what to do when there is no soap for hand washing?

[0]❑ No plan [1]❑ Plan, please specify: ➔ **B203**

B203 Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	Borrow from neighbor, relative, other people	4	Use ash
2	Wash with water /use only water	5	Other:
3	Use sand		

B204 Do you have a plan what to do to avoid forgetting to wash hands with soap and water?

[0]❑ No plan [1]❑ Plan, please specify: ➔ **B204a**

B204a Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	Put soap in visible/specific place	3	Other:
2	Put soap and water together (at a near place)		

B205 Do you think that always washing hands with soap and water is expensive?

1	2	3	4	5
Not at all expensive	A little expensive	Quite expensive	Expensive	Very expensive

B206 Do you think that the hand washing facility is far away from your usual area of activity?

1	2	3	4	5
Not at all far away	A little far away	Quite far away	Far away	Very far away

B207* (Open!)** What are the difficulties with regard to washing hands with water and soap? ***Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	No water	5	There are no difficulties
2	No soap	6	No time
3	Forgetting	7	I don't know
4	The distance to the water source/provider	8	Other:

B12 After you cared for a sick person, how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

B13 After you were in contact/touched bodily fluids (blood, stool, vomit) of someone (child, family members, others) how often do you wash your hands with soap and water?

0	1	2	3	4	5
I never do this	(Almost) at no time	At times	Half of the times	Most of the times	(Almost) each time

Not touching a sick person who might be suffering from Ebola

Please inform the respondent!! In the following we will talk about the situation, if there would be someone in your household, who shows signs and symptoms of Ebola. In that case, you have to avoid to touch this person and you have to call the Ebola hotline to inform about this person!!!

B300 How high do you think is the risk that you get Ebola, if **YOU TOUCH** a person who is suffering from Ebola?

1	2	3	4	5
No risk	*Little risk*	*Medium risk*	A risk	High risk

***B300a If 1-3* for *B300*:** Why do you think that **THERE IS NO RISK, LITTLE RISK OR A MEDIUM RISK** that you get Ebola, if you touch a person who is suffering from Ebola?

[0]☐ I don't know [1]☐ Other, please specify:……

Attitudes regarding not to touch a sick person who might be suffering from Ebola

B301 How certain are you that **NOT** touching a sick person who might have Ebola prevents you from getting Ebola?

1	2	3	4	5
Not certain at all	*A little certain*	*Medium certain*	Certain	Very certain

***B301a If 1-3 for B301*:** Why are you **NOT CERTAIN** or **NOT VERY CERTAIN** that not touching a sick person prevents you from getting Ebola?

[0]❑ I don't know [1]❑ Other, please specify:……

Norms regarding not to touch a sick person who might be suffering from Ebola

Interviewer: Please explain to the study participant: ***We are looking for the perception of the respondent, not for his/her knowledge!!***

B304b What would others think if you **DON'T** touch a sick person anymore who might be suffering from Ebola? ***Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!***

1	They would think I am a not a nice person	4	They would think I am selfish
2	They would think I am crazy	5	I don't know
3	They would think I don't want to help this person	6	Other:

Ability factors regarding not to touch a sick person who might be suffering from Ebola

B308a How much control do you have over whether you **DON'T touch** a person who might be suffering from Ebola while this person is in your household ?

1	2	3	4	5
Not at all under my control	*A little under my control*	*Medium under my control*	Under my control	Very much under my control

B308b If 1-3 for B308a: Why do you think it is **NOT FULLY UNDER YOUR CONTROL** that you don't touch a person who might be suffering from Ebola while this person is in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

B301b What are the reasons that **YOU WOULD CONTINUE** to touch someone who might be suffering from Ebola?

Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	I would never touch a someone who might be suffering from Ebola	5	Everybody touches sick people
2	It's not ok not to touch somebody who is sick	6	I don't know
3	I don't know if it might not be another disease and not Ebola	7	Because its impolite not to touch a sick person
4	I have to help and that's not possible without touching the sick person	8	Other:

Self-regulation factors regarding not to touch a sick person who might have Ebola

B309 How important is it for you **NOT** to touch a person who might be suffering from Ebola while this person is in your household?

1	2	3	4	5
Not at all important	A little important	Medium important	Important	Very important

B309a How important is it for you **TO TOUCH** a person who might be suffering from Ebola while this person is in your household?

1	2	3	4	5
Not at all important	*A little important*	*Medium important*	*Important*	*Very important*

B309b If 2-5 for B309a: Why is it a **LITTLE IMPORTANT/MEDIUM IMPORTANT/IMPORTANT/VERY IMPORTANT** for you **TO TOUCH** a person who might be suffering from Ebola while this person is in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

B310 How committed do you feel **NOT** to touch a person who might be suffering from Ebola while this person is in your household?

1	2	3	4	5
Not at all committed	A little committed	Medium committed	Committed	Very committed

B310a How committed do you feel **TO TOUCH** a person who might be suffering from Ebola while this person is in your household?

1	2	3	4	5
Not at all committed	*A little committed*	*Medium committed*	*Committed*	*Very committed*

B310b If 2-5 for B310a: Why do you feel **A LITTLE/MEDIUM/COMMITTED OR VERY COMMITTED TO TOUCH** a person who might be suffering from Ebola while this person is in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

Calling the Ebola hotline

B401 Can you tell me the number of the Ebola hotline?.....

[1]□ I did not know that there is a Ebola hotline [2]□ I have heard about the Ebola hotline but I forgot the number

⇨ **If the respondent cannot tell you the right number: tell him/her the right number**: **1025**

Attitudes regarding calling the Ebola hotline

B402 How certain are you that calling the Ebola hotline will help you or a person who might be suffering from Ebola?

1	2	3	4	5
Not certain at all	A little certain	Medium certain	Certain	Very certain

***B403* If "not certain at all":** Why are you **NOT CERTAIN AT ALL** that it will help you or the sick person if you call the Ebola hotline?

Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! More than one answer possible!

1	It is God's will/decision	4	I don't know
2	Health centres or doctors cannot help	5	Other:
3	It is not possible to treat Ebola	6	

Norms regarding calling the Ebola hotline

Interviewer: Please explain to the study participant: ***We are looking for the perception of the respondent, not for his/her knowledge!!***

B404 How many people of your household would call the Ebola hotline if there would be a person who might be suffering from Ebola in your household?

1	2	3	4	5
(Almost) nobody	*Some of them*	*Half of them*	*Most of them*	(Almost) all of them

B405 If 1-4 for B404: Why do you think that **NOT ALL** people of your household would call the Ebola hotline if there would be a person who might be suffering from Ebola in the household?

[0]❑ I don't know [1]❑ Other, please specify:…….

B406 How many people of your village would call the Ebola hotline if there would be a person who might be suffering from Ebola in the same household?

1	2	3	4	5
(Almost) nobody	*Some of them*	*Half of them*	*Most of them*	(Almost) all of them

B407 If 1-4 for B406: Why do you think that **NOT ALL** people of your village would call the Ebola hotline if there would be a person who might be suffering from Ebola in the household?

[0]❑ I don't know [1]❑ Other, please specify:…….

B408 People who are important to you (e.g. your family members, friends, other important people), how much do they approve that you would call the Ebola and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all	A little	Medium	Strongly	Very strongly

B409 People who are important in the village (e.g. Imam, Marabout, head of village, etc.), how much do they approve that you would call the Ebola hotline and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all	*A little*	*Medium*	Strongly	Very strongly

B410 If 1-3 for B409: Why do you think that people who are important in the village **WOULD NOT APPROVE IT STRONGLY OR VERY STRONGLY** that you call the Ebola hotline if there would be a person who might be suffering from Ebola in the household?

[0]❑ I don't know [1]❑ Other, please specify:……

B411 How strongly do you feel a personal obligation to yourself to call the Ebola hotline if there would be a person who might be suffering from Ebola in your household?

1	2	3	4	5
No personal obligation at all	Weak personal obligation	Medium personal obligation	A strong personal obligation	Very strong personal obligation

Ability factors regarding calling the Ebola hotline

B412 How difficult would it be to call the Ebola hotline and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all difficult	*A little difficult*	*Medium difficult*	*Difficult*	*Very difficult*

B413 If 2-5 for B412: Why do you think that it would be **A LITTLE/MEDIUM/DIFFICULT OR VERY DIFFICULT** to call the Ebola hotline and report the suspected Ebola case in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

1	Transport costs	4	Availability of network
2	Skills and knowledge how to manage the suspected person	5	Emergency response from concern authorities can be difficult or late
3	Person affected may term it as direct infringement on his/her personal privacy	6	People may term you as a bad person for reporting the case

B414 How confident are you that you can call the Ebola hotline and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all confident	*A little confident*	*Medium confident*	Confident	Very confident

B415 If 1-3 for B414: Why are you not **FULLY CONFIDENT** that you can call the Ebola hotline and report the suspected Ebola case in your household?

[0]❑ I don't know [1]❑ Other, please specify:……

Self-regulation factors regarding calling the Ebola hotline

B416 How important is it for you to to call the Ebola hotline and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all important	A little important	Medium important	Important	Very important

B417 How committed do you feel to call the Ebola hotline and report the suspected Ebola case in your household?

1	2	3	4	5
Not at all committed	A little committed	Medium committed	Committed	Very committed

B418 What would be a reason to **NOT** call the Ebola hotline and report a suspected Ebola case in your household?

Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	The police will put my household into quarantine	3	I don't know
2	Other people will think we are not clean/hygienic	4	Other:

Evaluation of promotion activities

Please inform the respondent!! Since the current Ebola outbreak in Guinea, Liberia and Sierra Leone, hygiene promotion and Ebola response was conducted in the region where you live. People from **Concern Universal, TARUD/FFHC or the community** talked with you directly about hand washing, hygiene and Ebola. We now would like to talk about the information you might have received there.

B700 Since the current Ebola outbreak, have you received information about hygiene, hand washing and Ebola from the following sources?		***B701*** How many times?	***B702*** Did/do you like it?	***B703*** Was/is the information rather unconvincing or convincing?	***B704*** Is the source rather untrustworthy or trustworthy?
a	**Home visit** of people from Concern Universal, TARUD, FFHC or the community who discussed hygiene behavior with you and informed you about Ebola signs. [1]□yes [0]□ no [9]□ I don't remember	[1]□ 1 time [2]□ 2-5 times [3]□ 6-10 times [4]□ More than 10 tms. [5]□ Many times	[1]□ Not at all [2]□ A little [3]□ Quite [4]□ I liked it [5]□ Very much	[1]□ Very unconvincing [2]□ Unconvincing [3]□ Neither nor [4]□ Convincing [5]□ Very convincing	[1]□ Very untrustworthy [2]□ Untrustworthy [3]□ Neither nor [4]□ Trustworthy [5]□ Very trustworthy
b	**Poster with information about Ebola on public places.** [1]□yes [0]□ no [9]□ I don't remember	[1]□ 1 time [2]□ 2-5 times [3]□ 6-10 times [4]□ More than 10 tms. [5]□ Many times	[1]□ Not at all [2]□ A little [3]□ Quite [4]□ I liked it [5]□ Very much	[1]□ Very unconvincing [2]□ Unconvincing [3]□ Neither nor [4]□ Convincing [5]□ Very convincing	[1]□ Very untrustworthy [2]□ Untrustworthy [3]□ Neither nor [4]□ Trustworthy [5]□ Very trustworthy
c	**Ebola information sheet for the household.** [1]□yes [0]□ no [9]□ I don't remember	[1]□ 1 time [2]□ 2-5 times [3]□ 6-10 times [4]□ More than 10 tms. [5]□ Many times	[1]□ Not at all [2]□ A little [3]□ Quite [4]□ I liked it [5]□ Very much	[1]□ Very unconvincing [2]□ Unconvincing [3]□ Neither nor [4]□ Convincing [5]□ Very convincing	[1]□ Very untrustworthy [2]□ Untrustworthy [3]□ Neither nor [4]□ Trustworthy [5]□ Very trustworthy

Interviewer: the following section is only applicable to respondents who **EXPERIENCED ANY FORM OF PROMOTION**. **If the respondent did not experience any form of promotion go to B154 at the end of page 19 (Hygiene proxy measures 2)**

Has anyone of Concern Universal, TARUD/FFHC or the community health workers provided your household with one of the following?

Hygiene kit including…

B722 Soap? [1] □yes [0]□ no [9]□ I don't remember
B723 Bleach? [1] □yes [0]□ no [9]□ I don't remember
B724 Material for a tippy tap? [1] □yes [0]□ no [9]□ I don't remember
B725 Cups? [1] □yes [0]□ no [9]□ I don't remember
B726 Bucket? [1] □yes [0]□ no [9]□ I don't remember
B727 Ebola flyer? [1] □yes [0]□ no [9]□ I don't remember

B724a* If yes to *B724 *(*Material for a tippy tap): Did you construct a tippy tap in/around your household?

[1]□yes [0]□ no

B724b ***If YES to B724a:*** After having constructed a tippy tap for hand washing, do you wash your hands more often, the same or less often than before?

1	2	3	4	5
Not at all more often	A little more often	The same as before	More often	Much more often

B724c ***If NO to B724a:*** Why not? Please specify:……

B728 You received information about hygiene, hand washing and Ebola. Can you recall what you learned thereby regarding hygiene, hand washing and Ebola?

Interviewer: Ask open-ended and check the according boxes. More than one answer possible! Do NOT read the answers!!

1	Avoid direct contact with infected persons and defunct died of Ebola	11	Non consumption of bush meat
2	In case of having fever, muscle pain, headache, diarrhoea, vomiting, bleeding: go to the next health centre	12	Use toilets, don't practice open defecation
3	All persons, even if they don't show any symptoms, have to inform the health workers if they were in contact with someone who is suffering from Ebola	13	Good hygiene and maintaining a clean environment.
4	If someone dies of Ebola or due to an illness which is not known, you have to inform the health worker or the health centre	14	Don't touch dead bush animals
5	Don't touch a dead body or personal things from someone who died of Ebola	15	Calling the Ebola hotline if there is a suspected case
6	Regular hand washing with soap and water at key times (before eating, after contact with feces)	16	I don't remember
7	Drink boiled or disinfected water	17	Other:
8	If you notice that you suffer from: headache, fever, vomiting, joint pain, bleeding: report to a health facility!		
9	Avoid to eat dead animals, especially monkeys		
10	Disinfection of all food which is consumed raw (fruits, vegetables)		

Information evaluation

B730 Does the information you received correspond to your view of Ebola?

1	2	3	4	5
Not at all	*A little*	*Quite*	Yes	Very much

B730a ***If 1-3 for B730:*** Why does the received information **NOT, ONLY A LITTLE OR ONLY QUITE** correspond to your view of Ebola?

[0]❑ I don't know [1]❑ Other, please specify:……

B731 Was the information you received novel to you?

1	2	3	4	5
Not at all new	A little new	Quite new	New	Very new

B732 Was the information you received important?

1	2	3	4	5
Not at all important	A little important	Quite important	Important	Very important

B733 Will the information you received be helpful for you in the future?

1	2	3	4	5
Not at all helpful	A little helpful	Quite helpful	Helpful	Very helpful

Promoter evaluation

B729 Do you know the workers from **Concern Universal, TARUD/FFHC or the community health workers** which work in your community?

(Open!) Interviewer: ask open-ended and check the according boxes. Do NOT read the answers!! Only one answer possible!

1	2	3	4
None of them ⇨ **B154**	Only workers from Concern Universal or TARUD/FFHC	Only community health workers	Both

Interviewer: If the respondent does NOT know either the workers from Concern Universal or TARUD/FFHC or the community health workers (if 1 to B729) → go to B154!

How do you think about the person(s) from whom you received the information?

B780 Did the persons know what they were talking about?

1	2	3	4	5
No	A little	Medium	Yes	Very much

B781 Were they nice persons?

1	2	3	4	5
No	A little	Medium	Yes	Very nice persons

B782 Do you trust this persons?

1	2	3	4	5
No	A little	Medium	Yes	Very much

B783 Do you know Universal/TARUD/FFHC?

1	2	3	4	5
No	*A little*	*Medium*	*Yes*	*Very much*

B784 *If 2-5* for ***B783***: Do you like Universal/TARUD/FFHC?

1	2	3	4	5
No	A little	Medium	Yes	Very much

B785 *If 2-5* for ***B783:*** Do you trust Concern Universal/TARUD/FFHC?

1	2	3	4	5
No	A little	Medium	Yes	Very much

Hygiene proxy measures - 2

B154 Can you show me how you usually wash your hands? 1☐ *yes* 0☐ No, no permission to see

Interviewer: If permission to see, OBSERVE how the person washes and dries hands!
If NO permission to see → go to B158 below

B155 How did the person wash her/his hands?

1	2	3	4	5	6
Washed one hand with water	Washed both hands with water	Washed one hand with soap and water	Washed both hands with soap and water	Washed hands in soapy water	Other:

***B156* Observe!** Did the person clean under the nails? [1] yes [0] no

***B157* Observe!** Did the person dry her/his hands?

1	2	3	4
Did not dry / Air dries the hands	Dries hands with clean towel	Dries hands with dirty towel	Dries hands with cloth

B158 Do you have a specific place and facility for hand washing? [1] *yes* [0] *no*

B159 If YES to B158: Can you show it to me? [1] yes [0] *No, no permission to see*

Interviewer: If NO to B158 or NO to B159 → go to B500 (Data of the household)

***B160 Interviewer:* Observe!** Where is the hand washing facility/device (e.g. jerry can/mug) located? **More than one answer possible!!**

1	Inside or near the latrine	4	Outside the house near the door
2	Inside the house near the cooking place/fire	5	Elsewhere in the compound
3	Elsewhere in the house	6	Other:

***B161 Interviewer:* Observe!** Is water present at the specific place?

[1] No water [2] Water is present

***B162 Interviewer:* Observe!** What device is used for water at the specific place?

1	Tippy tap	4	Bucket
2	Mug/cup	5	Jerry can
3	Tap from running water	6	Other:

***B163 Interviewer:* Observe!** Is soap or detergent present at the specific place?

1	None	4	Liquid soap (including shampoo)
2	Soap powder	5	Laundry soap
3	Bathing soap	6	Other:

***B164 Interviewer:* Observe!** Is another cleansing agent present at the specific place?

1	2	3	4
None	Sand	Ash	Other:

B165 Does the facility allow unassisted washing and rinsing of both hands?

[1] yes [0] no

B166 For defecation, do you use…

[1] *a latrine in your own household?* [2] the latrine of a neighbor? [3] I don't use a latrine, I practice open defecation

***B167 If 1 for B166*: Observe!** Is there a specific place for hand washing after contact with stool?

1	2	3
Yes, but it is the same as for washing hands before handling food	Yes, it is different from the place for washing hands before handling food	No

Data of the household

B500 Number of persons living in the household (incl. children) (TOTAL): .....

B501 Number of children below 5 years living in the household: .....

B502 Monthly expenditure: ..... GMD -9□ I don't know

B503 Daily expenditure:……GMD -9□ I don't know

B504 Monthly income

1	< 5000 GMD	6	>20'000 GMD
2	Between 5000 and 7500 GMD	7	I don 't know
3	Between 7500 and 10'000 GMD		
4	Between 10'000 and 15'000 GMD		
5	Between 15'000 and 20'000 GMD		

In your household, do you or someone living in your household have the following amenities (not broken)?

B600 Motorbike/scooter/car 1□ yes 0□ no

B601 Fridge 1□ yes 0□ no

B602 A radio 1□ yes 0□ no ***B602a*** Do you use the radio to inform yourself? 1□ yes 0□ no

B603 A television 1□ yes 0□ no ***B603a*** Do you use the TV to inform yourself? 1□ yes 0□ no

B604 A mobile phone 1□ yes 0□ no

Ask…..

B605 If a household member has a bank account 1□ yes 0□ no

B606 If the household has electricity 1□ yes 0□ no

B607 If the household has running water 1□ yes 0□ no

Thank you very much for taking the time to talk with us! We finished the interview.

End time: ..... …….

General observations

Interviewer, please write down your personal impression of the interview.

B800 Do you think there were questions which haven't been answered honestly by the respondent?

1□ yes 0□ no ➔**If yes:** Please write down the according number of the question

Question number:……
Why do you think that the answer was not honest?.....

B801 Were there questions which were difficult to answer for the respondent? 1□ yes 0□ no

➔**If yes:** Please write down the according number of the question

Question number :……..

Why was it difficult?.....

B802 Are there any other remarks with regard to the interview? 1□ yes 0□ no
➔**If yes:** Please write it down here: .....

Official use: (only for the supervisor!)

Checked: ❑ yes Initials: .....…… **Data entry 1:** ❑ yes, Initials:……..

Data entry 2: ❑ yes, Initials:……

Curriculum vitae

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Education

Apr 2013 – Dec 2017	Eawag, the Swiss Federal Institute of Aquatic Science & Technology, and University of Zurich, Switzerland: PhD programme in applied social and health psychology with an emphasis on behaviour change in the WASH sector in developing countries *PhD studies*
June/July 2017	Centre d'hydrogéologie et de géothermie, Université de Neuchâtel and ICRC Training Course Water and Sanitation Engineering: From Emergency towards Development
Aug 2016	Swiss Summer School, Lugano, Switzerland Course: Analysis of Variance (ANOVA)
2014 - 2016	NADEL, Center for Development and Cooperation, ETH Zurich, Switzerland *Certificate of Advanced Studies in Development and Cooperation*
Oct 2005 – Mar 2013	University of Zurich, Switzerland Studies in Social Psychology, Psychopathology of Children and Youth and Political Science *Degree: Master of Science* Thesis title: Long-term effectiveness of health promotions to increase safe water consumption: a longitudinal field study in rural Ethiopia (in German)

Professional experience

2013 – 2017	Eawag, Swiss Federal Institute of Aquatic Science and Technology, Duebendorf, Environmental Social Sciences (ESS) *Research fellow*
2009 - 2013	Florhof, Crisis Intervention for Children and Youth, Zurich *Social education worker*
2009 - 2012	Swiss Red Cross (SRK) *Teacher vocational integration of adolescents*

Teaching

Sept – Dec 2009	University of Zurich, Switzerland Trainer of Social Competence Training (PGS) for psychology students

Projects

2015 - 2017	"Vivre avec l'eau, live with water" (funded by DFID) Partnership for Integrated Urban Flood Prevention in Senegal *Evaluation of interventions to foster sound waste management practices of households in Dakar, Senegal.*
2015 - 2016	Ebola prevention: Risks, Attitudes, Norms, Abilities, and Self-Regulation *Consultancy for UNICEF Guinea-Bissau*
2015	Ebola prevention project in the Gambia and Guinea-Bissau (funded by Oxfam America) Hand washing behaviour, intention to take action to prevention behaviours and evaluation of Ebola prevention activities in the Gambia and Guinea-Bissau
2013 – 2015	Sanitation and hygiene behaviour change research: a longitudinal study in the flood-affected suburbs of Dakar, Senegal (funded by Oxfam America) *Design, implementation and evaluation of interventions promoting flood-adapted toilets and hand washing with soap at key times*

Publications

Peer-reviewed

Gamma, A. E., Slekiene, J., Von Medeazza, G., Asplund, F., Cardoso, P. & Mosler, H.-J. (2017). Contextual and psychosocial factors predicting Ebola prevention behaviours using the RANAS approach to behaviour change in Guinea-Bissau. *BMC public health,17*(1), 446. doi: 10.1186/s12889-017-4360-2

In progress

Gamma, A. E., Slekiene, J. & Mosler, H.-J. (2017). The impact of various promotional activities on Ebola prevention behaviours and psychosocial factors predicting Ebola prevention behaviours in the Gambia. Manuscript submitted for publication.

Gamma, A. E. & Mosler, H.-J. (2017). Predicting handwashing habit during an Ebola outbreak in Guinea-Bissau. Manuscript submitted for publication.

Oral presentations

Gamma, A. E. & Mosler, H.-J. (2016). *L'approche RANAS pour le changement de comportement liés à l'eau, l'assainissement et l'hygiène.* Oral presentation together with Helvetas at the Rural Water Supply Network 2016, *7ème Forum RWSN,* Abidjan, Ivory Coast.

Gamma, A. E. & Mosler, H.-J. (2016). *Determinants of Ebola preparedness in Guinea-Bissau and the Gambia.* Oral presentation at the International Social Behavior Change Communication Summit 2016, Addis Ababa, Ethiopia.

Gamma, A. E. & Mosler, H.-J. (2015). *Hand washing behavior change: A longitudinal study on interventions which target norms and self-efficacy in enhancing hand washing in flood-prone areas of Dakar's suburbs, Senegal.* Oral presentation at the 2015 Water and Health Conference: Where Science meets Policy, Chapel Hill, USA.

Gamma, A. E. & Mosler, H.-J. (2014). *Determinants of commitment and willingness to pay for flood-adapted toilets in Dakar, Senegal.* Oral presentation at the 2014 Water and Health Conference: Where Science meets Policy, Chapel Hill, USA.

Poster presentations

Gamma, A. E., Slekiene, J. & Mosler, H.-J. (2017). *Effects of Ebola preventing interventions on psychosocial factors of the RANAS model.* Poster presented at the 2017 Water and Health Conference: Where Science meets Policy, Chapel Hill, USA.

Gamma, A. E. & Mosler, H.-J. (2016). *The RANAS approach to systematic behavior change: handwashing in peri-urban Harare, Zimbabwe. Poster presented at the* Rural Water Supply Network

2016, *7ème Forum RWSN,* Abidjan, Ivory Coast.

Gamma, A. E. & Mosler, H.-J. (2016). *Effects of Behavior Change Interventions on Observed Handwashing with Soap in Senegal: A Longitudinal Study in Senegal.* Poster presented at the 2016 Water and Health Conference: Where Science meets Policy, Chapel Hill, USA.

Gamma, A. E. & Mosler, H.-J. (2015). *How well are the populations in Guinea-Bissau and the Gambia prepared for an Ebola outbreak? Determinants measured by the RANAS-model.* Poster presented at the 2015 Water and Health Conference: Where Science meets Policy, Chapel Hill, USA.

Languages

German	Native language
English, French	Very good knowledge (C1)
Italian, Spanish	Good knowledge (B1)
Portuguese	Basic communication skills (A2)